

## Susitna-Watana Hydroelectric Project Document

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**Susitna-Watana Hydroelectric Project  
(FERC No. 14241)**

**Social Conditions and Public Goods and Services  
Study  
Study Plan Section 15.6  
Final Study Plan**

Alaska Energy Authority



July 2013

## 15.6. Social Conditions and Public Goods and Services Study

On December 14, 2012, Alaska Energy Authority (AEA) filed with the Federal Energy Regulatory Commission (FERC or Commission) its Revised Study Plan (RSP), which included 58 individual study plans (AEA 2012). Section 15.6 of the RSP described the Social Conditions and Public Goods and Services Study. This study focuses on assessing potential changes in population, housing, public goods and services, and other quality of life factors resulting from the construction and operation of the proposed Project and potential changes in regional economic conditions resulting from the non-power effects of the Project. RSP 15.6 provided goals, objectives, and proposed methods for data collection.

On February 1, 2013, FERC staff issued its study plan determination (February 1 SPD) for 44 of the 58 studies, approving 31 studies as filed and 13 with modifications. RSP Section 15.6 was one of the 31 studies approved with no modifications. As such, in finalizing and issuing Final Study Plan Section 15.6, AEA has made no modifications to this study from its Revised Study Plan.

### 15.6.1. General Description of the Proposed Study

#### 15.6.1.1. Study Goals and Objectives

The study goal for the social conditions and public goods and services section of the socioeconomics study plan is to assess potential changes in population, housing, public goods and services, and other quality of life factors resulting from the construction and operation of the proposed Project and potential changes in regional economic conditions resulting from the non-power effects of the Project. Coordination with the other social resource analyses (e.g., recreation (Section 12.5), transportation (Section 15.9), and subsistence (Section 14.5)) from the outset is an essential component of this study plan.

The objectives of the study are listed below.

- Describe, using text and appropriate tables and graphics, existing socioeconomic conditions within the study area.
- Evaluate the effects of on-site manpower requirements, including the number of construction personnel who currently reside within the study area, who would commute to the site from outside the study area, or who would relocate temporarily within the study area.
- Estimate total worker payroll and material purchases during construction and operation.
- Evaluate the impact of any substantial immigration of people on governmental facilities and services, and describe plans to address the impact on local infrastructure.
- Determine whether existing housing within the study area is sufficient to meet the needs of the additional population.
- Describe the number and types of residences and businesses that might be displaced by the Project access road and transmission corridors.

- Describe, based on other studies, what bio-physical attributes of the Susitna River system may change as a result of the Project and what those changes might mean to commercial opportunities related to fishing, logging, agriculture, mining, and recreational activities, recreation and subsistence use values, quality of life, community use patterns, non-use environmental values, and social conditions of the area.

### **15.6.2. Existing Information and Need for Additional Information**

A data gap analysis report of socioeconomics, recreation, air quality, and transportation was prepared in August 2011 (HDR 2011). That report along with AEA's 2011 PAD provides substantial information about the Project and socioeconomic resources in the Project vicinity.

Information provided for communities within the study area by the U.S. Census Bureau, the Alaska Department of Labor and Workforce Development (ADLWD), the Alaska Department of Commerce, Community and Economic Development (DCCED), MSB, Denali Borough, and other secondary sources includes the following:

- Current population and population density statistics
- Per capita income
- Number and composition of workforce (e.g., manufacturing; transportation and public utilities; wholesale trade; retail trade; finance, insurance, and real estate; and services)
- Current unemployment rate (latest year of record)
- Number of units and vacancy rates for temporary housing (e.g., apartment rentals, hotels/motels, and campgrounds)
- Location and availability of local government public services (e.g., police, fire protection, medical services, utilities, and schools)
- Local tax revenues and sources of funding (e.g., personal property, sales, hotel/motel occupancy, etc.)

Information that will be needed to complete the analysis of the direct effects of the Project includes the following:

- Final location of the Project components
- Duration and schedule of construction phase
- Cost of materials and supplies during construction
- Approximate cost of materials and supplies during construction that will be spent locally, versus non-locally
- Size of total workforce, including how many workers will be hired locally versus non-locally (data from the ADLWD on employment by occupation will be used to estimate the percent of out-of-state workers)
- Total size of construction workforce by month, or peak number of workers and when that peak would occur
- Summary of construction workforce by craft or discipline
- Total construction wages or average construction pay, including benefits
- Total number of workers required for operation and maintenance of the Project, and total wages including benefits
- Approximate cost of materials, supplies, and services that will be purchased locally versus non-locally during operations

- For trucks that would be used, estimated number and size, number of trips per day and week to and from the Project site, travel route, and capacity of the roads on which the trucks will be traveling
- The number of residences or businesses that could be displaced by construction of the Project
- Number of acres of agricultural/pasture land or timberland that will be removed from production

Information that will be needed to complete the analysis of the indirect effects of the Project is described in Section **Error! Reference source not found.**

### 15.6.3. Study Area

Based on the current Project description, the principal study area for the analysis of impacts on social conditions and public goods and services includes communities in the Denali Borough and MSB that are located in relatively close proximity to the proposed Project facilities, including the hydroelectric facility and access road and transmission line corridors. Most of the effects specific to these communities during the construction phase are related to the transportation and supply of construction materials, the number of construction workers that would work on the Project and their potential impact on population, public services and infrastructure, and temporary housing during construction. Within the Denali Borough, the principal community under consideration is Cantwell, as this is the closest community to the proposed Project. In the MSB, the closest communities are Trapper Creek, Chase, Talkeetna, and the “railroad community” located north of Chase.

A wide range of occupations is needed to construct and operate a large hydroelectric facility, and it is likely that workers in many regions of Alaska would benefit from the additional employment opportunities created by the Project. However, the largest concentration of workers with the required occupational skills is in highly populated Southcentral Alaska. The concentration of major engineering, construction, and manufacturing firms in the MOA makes it probable that this city would be most affected by construction period expenditures.

Transportation effects during the construction phase of the Project would occur in ports of entry for freight and along the subsequent transportation routes for supplies, equipment, and labor. Boroughs and census areas through which potential overland transportation routes pass include the MOA, FNSB, Valdez-Cordova Census Area, KPB, Yukon-Koyukuk Census Area, MSB, and Denali Borough.

During and after Project construction, there may be additional requirements for law enforcement and health and human services. The Alaska Department of Public Safety (ADPS) provides law enforcement in the unorganized areas of the state (census areas) and in areas of municipalities without police powers. State and Alaska Native programs provide most health and human services in Alaska.

Non-power effects of Project operations and features (i.e., reservoir and access roads) on local or regional economies, including changes in commercial opportunities related to fishing, hunting, boating, wildlife viewing, mountaineering, and other recreation, are likely to be concentrated in those communities in the Denali Borough and MSB that are located in relatively close proximity to the Project.

#### **15.6.4. Study Methods**

The study methods discussed below are consistent with socioeconomic analyses completed during the licensing proceedings for other hydroelectric projects (Public Utility District No. 1 of Chelan County 1999; PacificCorp 2004; Sacramento Municipal Utility District 2005).

##### **15.6.4.1. Data Collection and Analysis**

The proposed Project would not start operations until 2023 under the current schedule. The Project is anticipated to operate for more than 50 years, similar to other large hydroelectric developments around the world. The Project's socioeconomic effects will be estimated by comparing future socioeconomic conditions with and without the Project, considering the long time frame for operation of the Project.

The forecast of socioeconomic conditions with and without the Project will be based in part on estimates derived from the REMI model described in the Regional Economic Evaluation Study Plan (Section 15.5.4.1) as well as the direct effects associated with the Project. Subtracting the direct effects from the REMI model results will provide an estimate of the indirect effects of the Project. While the REMI model provides a wide range of output variables, the primary variables of interest in the socioeconomic impact analysis for the proposed Project are population, employment, labor income, output (sales), and housing. The REMI model extends economic and demographic forecasts through 2060, which is consistent with the temporal scope of the socioeconomic impact analysis. The REMI model can provide projections for all of the boroughs and census areas within the Railbelt, including the MOA, FNSB, KPB, MSB, and Denali Borough. The current REMI model also includes the Yukon-Koyukuk Census Area and Valdez-Cordova Census Area.

The forecast analysis performed by the REMI model will be guided by assumptions about reasonably foreseeable future actions that would have an important and measurable effect on Alaska's economy. The forecast for the MSB will be calibrated to be similar to the population forecast developed by the Borough and the Alaska Department of Transportation and Public Facilities. Additional information about the development of the REMI model assumptions is provided in the Regional Economic Evaluation Study Plan.

As the Project design is further refined, specific requirements for the types of construction specialties will be identified and compared with current expertise of regional construction companies to see which opportunities can be filled by Alaska firms. This evaluation will improve the model estimates of future economic activity and provide recommendations to increase the percentage of these opportunities captured by Alaska businesses.

The effect of potential immigration during Project construction and operations on municipal and state services, such as police, fire protection, medical services, and schools, will be assessed. For schools, the effect of the influx of additional school-age children on teacher-pupil ratios will be determined. In an attempt to identify changes to quality of life and overall natural resource uses trends and potential changes resulting from the Project, some survey questions will be added to the public survey proposed in the Recreation Resources and Aesthetic Study Plans (Section 12.5 and 12.6). The survey questions will be oriented toward identifying how the Susitna River corridor and upper basin is used and valued by local residents and to identify the importance of the various bio-physical aspects important to area residents. Once the types of Project-induced

changes in riverine and basin resources are known, a further analysis will be undertaken to identify how such changes might alter the resources used and valued by the area residents. The results of the Project effects on subsistence, recreation, and transportation can be used to further evaluate the overall effects on the residents of the region.

A fiscal impact analysis will be conducted to evaluate incremental local government expenditures in relation to incremental local government revenues that would result from construction and operation of the Project. Incremental expenditures could include, but would not be limited to, additional school operating, road maintenance and repair, public safety, and public utility costs. Incremental revenues could include, but would not be limited to, additional property tax and hotel/motel occupancy tax revenues.

Transportation of construction equipment and materials through communities on the transportation routes to and from the Project could result in increased rail traffic and road traffic volumes, with associated noise and congestion effects. Such conditions might require additional police and emergency response calls for traffic and other incidents. These impacts will be assessed based on the results of the Transportation Resources study. For example, estimates of changes in vehicle miles traveled can be converted into estimates of traffic incidents and injuries, which could place additional demands on police, emergency response, and medical services.

The economic impact of the Project on local tourism establishments (e.g., river sport fishing, whitewater boating, lodges) and the regional economy will be estimated using the results of the Recreation Resources and Aesthetic Studies (Section 12.5 and 12.6). Calculations will be based on information obtained from the recreation survey, including the estimated recreation-related expenditures per recreational day or trip and changes in the number of days or trips per year. The regional economic impact of changes in subsistence-related expenditures due to the proposed Project will be estimated using the results of the Subsistence Study. Approximate cash expenses to generate each pound of subsistence harvest will be based on published information.

The Project, including access roads, could affect surrounding property uses and values. These effects will be described by identifying the properties that are in or in close proximity to the Project area, including the access road(s) that will be built; determining the degree to which the use of the properties would change as a result of the Project; and estimating, to the extent practicable, the extent that property values may change as a result of the change in use.

If Project features (i.e., reservoir and access roads) stimulate residential development, spending by new residents in the local economy will generate new economic activity, including additional jobs and labor income. Interviews will be conducted with regional businesses to identify potential opportunities for residential development and estimate the economic impacts should this development occur.

To the extent that Project construction and operations will change the level of production of commercial farming, grazing, logging, mining, and fishing operations, these effects will be approximated by the change in production multiplied by the current price of the resource in question. Information on the quantity and value of market-based natural resources is available through state and federal resource management agencies.

Changes that result in increases or decreases in economic activity such as production of commercial resource extraction (e.g., commercial fishing production), or changes in spending for recreational goods and services will become inputs to the REMI model to calculate the regional

economic impacts. The annual incremental change (i.e., from the Without-Project condition) in dollars for each activity with the Project will be estimated and then added or subtracted from the Without-Project condition to arrive at the Project condition. The analysis will also identify those effects that are short-term or temporary in nature, which will likely be associated with construction activities, and those that are long-term and primarily associated with operations of the Project.

The study will address changes in recreation by using a Random Utility Model (RUM) combining existing data, recreation preference functions from the published literature, and new data collected by the Recreation and Aesthetics Study (see Section 12.5 and 12.6). These data and preference functions will be applied to the affected recreation population using 2010 U.S. Census population data and existing recreation participation rates. Once the existing preference functions are identified, they will be used to represent the demand for various recreation sites via specification of demand functions which place preference functions in the context of recreation opportunities. Based on population data and participation rates, these demand functions will be used to predict visitation across both the study area and substitute recreation sites when site characteristics are different than under Without-Project conditions. By evaluating differences in outcomes across Without-Project and With-Project behavioral simulations, the study will identify changes in site pressure and aggregated economic welfare (i.e., dollar-valued consumer satisfaction).

The approach for undertaking this analysis will use and be consistent with EPA's *Guidelines for Preparing Economic Analysis* (USEPA 2010). In addition, they will also follow the process for developing a systemic, socioeconomic and behavioral model of recreation demand as described in Bingham and Kinnell (2012). Bingham and Kinnell (2012) present a site-specific, dam management application of Deason, Dickie, Kinnell, and Shabman's 2010 Integrated Planning Framework. This work will be closely coordinated with the Recreation (Section 12.5) and Aesthetics (Section 12.6) Studies which will provide current estimates of recreation demand and collect much of the information that will be needed for the analysis.

Task 1. Identify recreation outcomes that are likely to occur under With-Project conditions.

In this task, the team will rely on the Recreation and Aesthetics Studies (Sections 12.5 and 12.6) to identify recreation outcomes that are likely to occur under With-Project conditions. At this stage we envision, the primary recreation activities to be considered include fishing, boating, hunting, and snow machining. Factors to be considered include all those features that affect the quality of a recreation trip, such as changes in access, solitude, crowding, harvest rates, and safety for snow machining.

Task 2. Assess currently available recreation data.

In this task, the team will review the information collected by the Recreation Resources and Aesthetics Studies (Sections 12.5 and 12.6) and collect other data as needed for the analysis. For example, the analysis for recreational fishing will evaluate the relevant angling population using population data from the 2010 Census Bureau and recreation participation rates from Alaska's Statewide Comprehensive Outdoor Recreation Plan (SCORP) (AKDNR 2009). The team



will also incorporate the findings of the Recreation Resources Study (Section 12.5) to estimate the affected population.

**Task 3. Identify and apply existing recreation utility functions from the literature.**

In this task, the team will identify existing recreation utility functions from the literature. Site-calibrated transfers of an existing random utility model (RUM) study will be used to capture important behavioral responses (i.e., changes in trip-taking behavior as a result of changes to a fishery). The accuracy of this methodology is limited only by the analyst's ability to calibrate an already-estimated preference function to a different population using appropriate economic methodologies (Smith, van Houtven, and Pattanayak 2002).

For example, a fishing site has numerous attributes including, but not limited to, the cost/time of reaching the site, catch rates, availability of boat ramps and so forth. The distance/travel cost for recreators to reach all relevant sites is a particularly important site attribute. An angler who chooses a closer site with a lower catch rate has "traded off" catch for distance/travel cost—providing an indication of the value of higher catch rates.

For recreational fishery benefits, AEA will develop the site-calibrated benefits transfer using a recreational fishing study conducted by Carson, Hanemann, and Wegge (2009). The nested logit model in this study uses weekly data on the sport fishing activities of 1,063 respondents over a 22-week period in 1986 to estimate the economic value of recreational fishing in Southcentral Alaska.

Calibrating the identified relationship to relevant sites, population, and fishery impacts provides the ability to estimate the economic benefits of the Project. To calibrate the results from the Carson, Hanemann, and Wegge (2009) study so that the estimates reflect angling activity near the proposed project, the analysis will be evaluated across the relevant angling population estimated in Task 2.

**Task 4. Identify recreation demand by appropriately combining existing utility functions with site characteristics under Without-Project and expected With-Project conditions.**

In this task, the team will identify recreation *demand* by appropriately combining these existing utility functions with site characteristics under Without-Project and expected With-Project conditions. The representation of recreation opportunities in a demand system allows identifying an individual's (or like-minded and located group's) likelihood of visiting a site under the specified site characteristics. Under this approach, Without-Project conditions and site visits are used to identify the econometric model. Under With-Project conditions, site characteristics will be different from Without-Project to reflect expected outcomes (i.e., changes in site availability, harvest rate, etc.). With this new set of opportunities, site choice simulations are conducted to identify expected changes in survey respondent's visits across the directly affected site and *all relevant substitute sites*. This allows estimating visitation at sites under conditions that are not currently occurring at those sites. In addition, because these forecasts arise from simulations of a structural demand system, it is possible to recover sophisticated economic metrics

such as changes in respondents' consumer surplus (i.e., willingness to pay) by making comparisons across Without-Project and With-Project models.

**Task 5. Identify aggregate demand using population data and participation rates.**

In this task the team will identify *aggregate demand* using 2010 Census weights and participation rates. Once demand systems representing individuals or groups are aggregated up to the population using Census population weights, we will identify socioeconomic metrics of most interest including site pressure under With-Project conditions as well as changes in aggregate social welfare and differences in social welfare changes across groups of people.

In short, the benefits transfer approach will be used to apply recreation preference functions from the published literature. Benefits transfer involves the application of unit value estimates, functions, data, and/or models from one or more previously conducted valuation studies to estimate benefits associated with the resource under consideration (Black et al. 1998).

The benefits transfer approach will also be used to estimate changes in non-use values (existence value, bequest value, option value) and values associated with ecological functions in the study area. Existing studies that could be used to derive estimates of non-use values and values associated with ecological functions for the study area include Colt (2001). Estimates of non-use values are typically obtained using the contingent valuation method, as this method is the only established technique for measuring these values (Black et al. 1998).

Following the methodology of Braund and Lonner (1982), information on the values, attitudes, and lifestyle preferences of residents in Talkeetna, Trapper Creek, Cantwell, Chase, and the area north of Chase will be collected through informal interviews with community residents, real estate professionals, MSB and Denali Borough officials, and other knowledgeable individuals. The interviews will be conducted using the Recreation Study Plan interview protocol as a template. Questions asked during these interviews will be oriented toward identifying how the Susitna River corridor and upper basin is used and valued by local residents. Therefore, all key informants will be selected for their first-hand knowledge about these topics. An attempt will be made to obtain a diverse set of informants with different backgrounds. This diversity will provide a broad range of perspectives. It is estimated that the number of people interviewed will be comparable to the 107 people interviewed by Braund and Lonner. Information collected from the informal interviews will be supplemented with data collected through the public survey proposed in the Recreation and Aesthetic Study, as well as secondary sources. The results of the analyses of Project effects on population, local economies, subsistence, recreation, and transportation will be used to evaluate the overall effects on the quality of life of residents of the region. Analysis results will be documented in the initial and updated study reports

#### **15.6.4.2. Work Products**

The results of the social conditions and public goods and services study will be documented in initial and updated study reports. The reports will include study objectives, study area, methods, and tabulated results.

### **15.6.5. Consistency with Generally Accepted Scientific Practice**

Much of the socioeconomic background information will come from published sources, including local governments, boroughs, state agencies, and the federal government. The REMI model being used to forecast future economic conditions has been calibrated for Alaska and has recently been used in work completed for the Alaska Pipeline Project. The REMI model is used by federal, state, and local governments as well as universities and consulting firms.

### **15.6.6. Schedule**

It is anticipated that completion of the work described above will require about six or seven months of effort in 2013 and will be summarized in an Initial Study Report in Q1 2014. There may be additional analyses or model runs in 2014 to incorporate information from the 2013 studies. These will be addressed in the Updated Study Report issued in Q1 2015 (see Table 15.6.1).

In 2014 and 2015, licensing participants will have opportunities to review and comment on the study reports (Initial Study Report in early 2014 and Updated Study Report in early 2015). Updates on the study progress will be provided during Technical Workgroup meetings which will be held quarterly in 2013 and 2014.

### **15.6.7. Relationship with Other Studies**

The Social Conditions and Public Goods and Services Study will require input from several other studies as shown in Figures 15.6-1 through 15.6-4, below. The study will conduct an economic valuation of changes in recreational and subsistence fishing and hunting using information provided by the Recreation and Aesthetics Study (Section 12.5) and Subsistence Resources Study (Section 14.5), both of which will incorporate data from the Fish and Aquatic Resources Study (Analysis of Fish Harvest, Section 9.15) and Wildlife Resources Study (Wildlife Harvest Analysis, Section 10.20). The economic effects of changes in the level of production of commercial fishing operations will be based on data from the Fish and Aquatic Resources Study (Analysis of Fish Harvest, Section 9.15).

The study will conduct an economic valuation of changes in recreational activities that are not dependent on fish or wildlife, such as boating and snow machining, using information provided by the Recreation and Aesthetics Study (Sections 12.5 and 12.6).

The regional economic impact of changes in expenditures related to recreation and subsistence activities related will be estimated using the results of the Recreation (Section 12.5) and Aesthetics (Section 12.6) Study and Subsistence Resources Study (Section 14.5), both of which will incorporate data from the Fish and Aquatic Resources Study (Analysis of Fish Harvest, Section 9.15) and Wildlife Resources Study (Wildlife Harvest Analysis, Section 10.20).

The socioeconomic effects of changes in transportation patterns will be assessed based on the results of the Transportation Resources Study, which will incorporate demographic and economic forecasts provided by the Social Conditions and Public Goods and Services Study.

### **15.6.8. Level of Effort and Cost**

The economic impact components will require an estimated 2,400 to 2,800 person-hours in 2013 and 2014. Limited secondary data for many of the communities in the study area will require telephone calls and executive interviews with businesses and other organizations to develop sufficient information to evaluate the socioeconomic effects of the Project on each community. This effort, including both the initial and updated study reports, would occur over a 8 to 9 month period. The estimated cost would range from about \$400,000 to \$500,000, depending on the final survey methodologies used.

The recreation, ecological services, and lifestyle preference components will require an estimated 2,400 to 3,600 person hours in 2013 and 2014. This work will require coordinating with other studies on their survey results, extraction of preference functions from existing studies, and collection of secondary data. The work may also require telephone calls, executive interviews, and focus groups. The estimated cost of this work ranges from \$400,000 to \$600,000.

The total estimated effort and cost for this study is 4,800 to 6,400 hours valued at \$800,000 to \$1.1 million.

### **15.6.9. Literature Cited**

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### 15.6.10. Tables

**Table 15.6-1. Schedule for implementation of the Social Conditions and Public Goods and Services Study.**

Activity	2012				2013				2014				2015
	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q	1 Q	2 Q	3 Q	4 Q	1 Q
Gather/Review Existing Information					—								
Document Existing Conditions						—							
Licensing participant Informal Interviews							—	—					
Initial Social Conditions and Public Good and Services Study Report								—	Δ				
Incorporate Information from Other Studies								—	—	—			
Updated Social Conditions and Public Good and Services Study Report											—	—	▲

**Legend:**

- Planned Activity
- Follow up activity (as needed)
- Δ Initial Study Report
- ▲ Updated Study Report

## 15.6.11. Figures

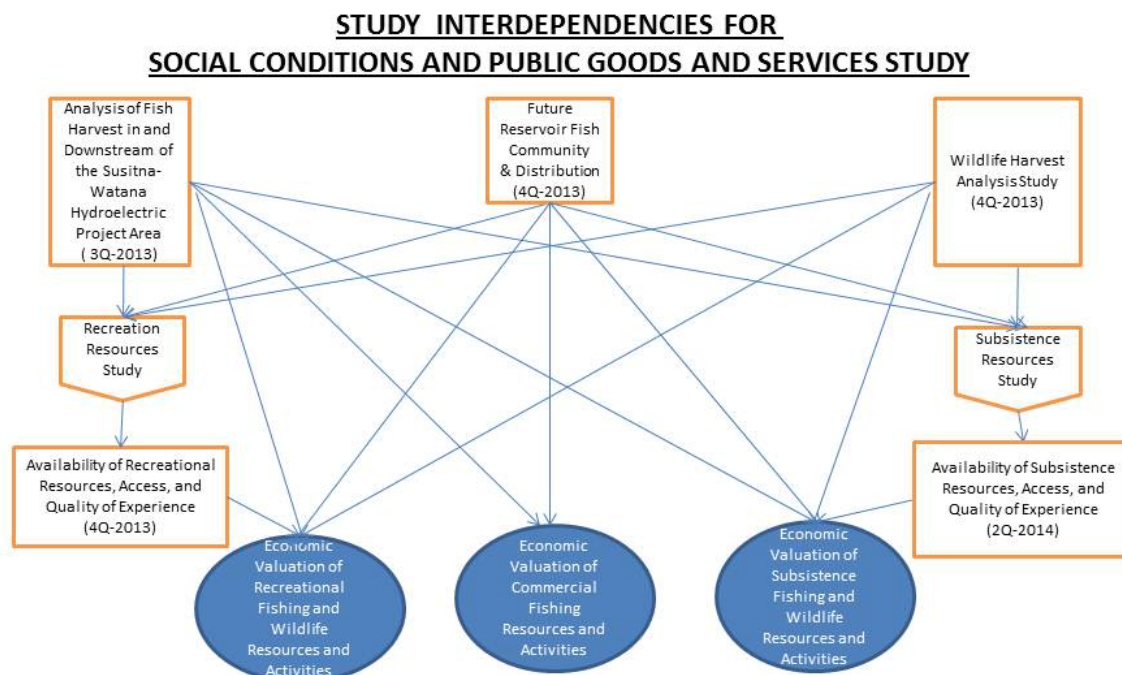


Figure 15.6-1. Fish and Wildlife Study Interdependencies for the Social Conditions and Public Goods and Services Study

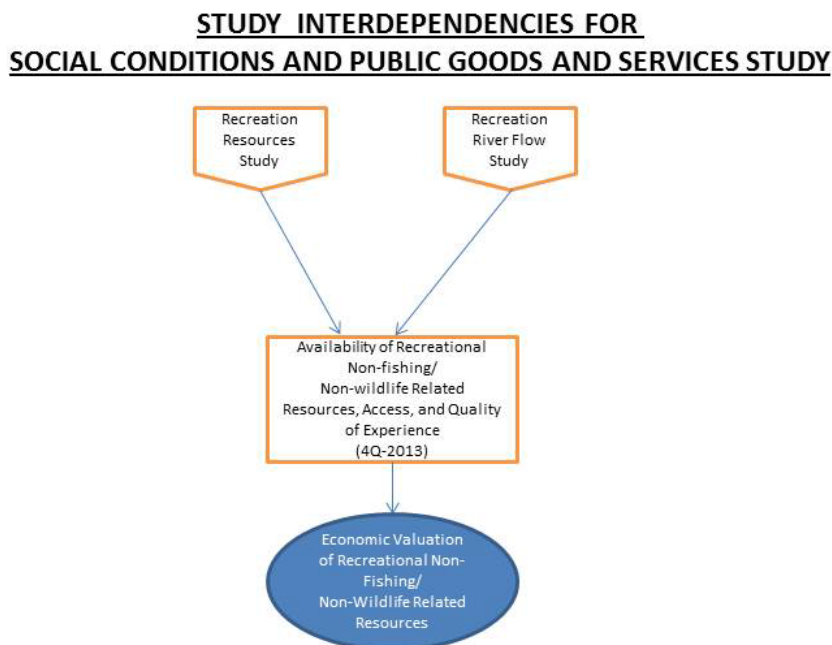
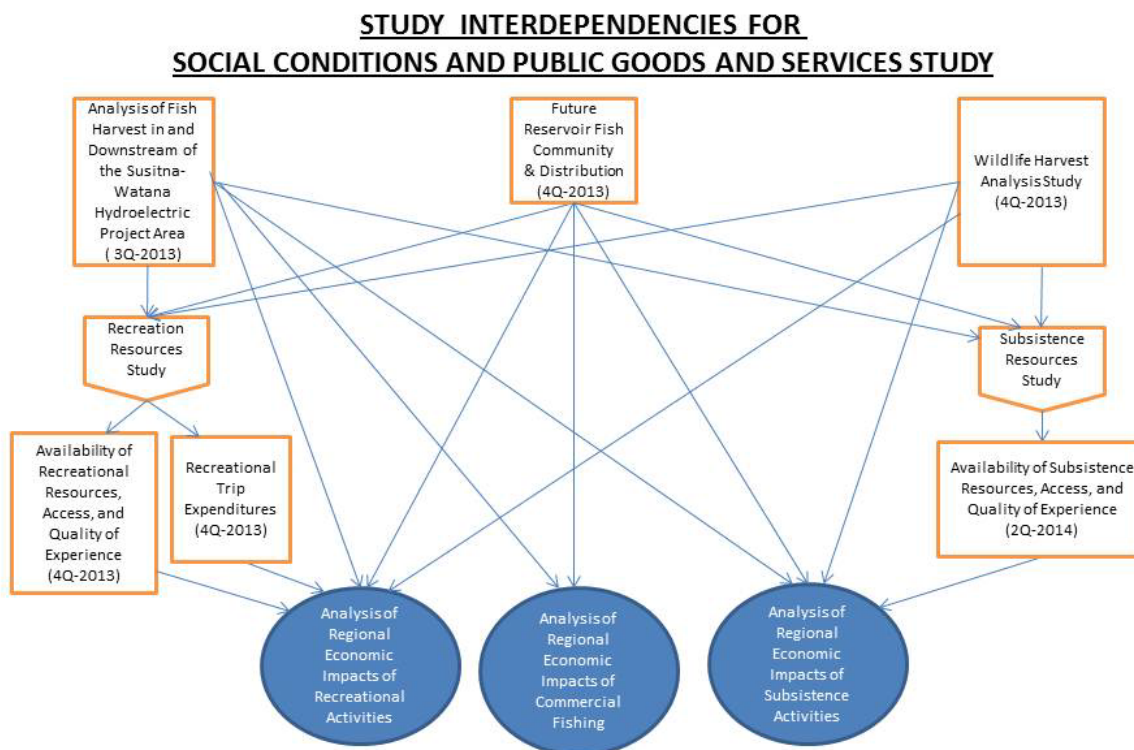
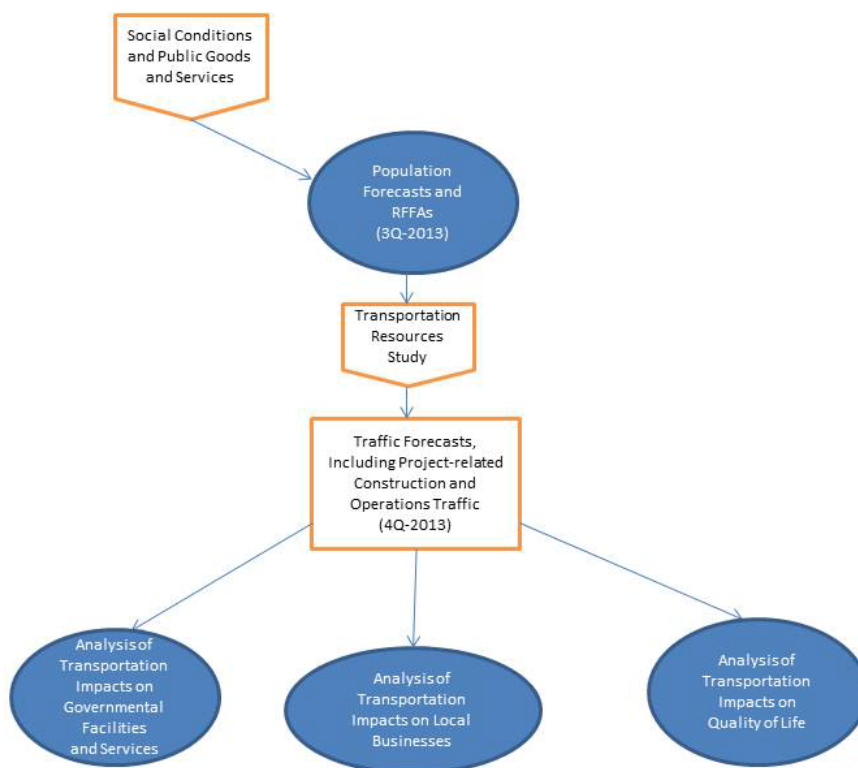


Figure 15.6-2. Recreation Study Interdependencies for the Social Conditions and Public Goods and Services Study.



**Figure 15.6-3. Fish and Wildlife Harvest Study Interdependencies for the Social Conditions and Public Goods and Services Study.**

**STUDY INTERDEPENDENCIES FOR**  
**SOCIAL CONDITIONS AND PUBLIC GOODS AND SERVICES STUDY**



**Figure 15.6-4. Social Conditions and Public Goods and Services Study Interdependencies with Transportation Study.**