

FINAL WORKING DRAFT

Klamath Hydroelectric Project Study Plans
(FERC Project No. 2082)

7.32 Analysis of ~~Proposed Project~~ Effects of Differences Between the Proposed Project and the Current Project on the Socioeconomic Environment – Phase 3 of the Socioeconomic Study

PacifiCorp
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7.2 7.3 ANALYSIS OF EFFECTS OF DIFFERENCES BETWEEN THE PROPOSED PROJECT AND THE CURRENT PROJECT-EFFECTS ON SOCIOECONOMIC ENVIRONMENT – PHASE 3 OF THE SOCIOECONOMIC STUDY?

7.2.1 Description and Purpose

~~The socioeconomic study will consist of three phases. is study will be conducted in two phases.~~
The ~~is~~ first phase will describe the existing socioeconomic condition in the study area and the current Klamath Hydroelectric Project and environmental and social measures in so far as they relate to socioeconomic factors. ~~-~~ The second phase is to conduct a high level socioeconomic analysis of the landscape options defined by the plenary. The third phase primarily will assess the changes in the socioeconomic condition in the study area due to the differences in the proposed Pproject and the current project, which will include protection, mitigation, and enhancement actions or PM&Es (e.g., new environmental and social measures). This will involve examining only the incremental effects due to any changes in the Project and PM&Es.

This study plan involves only Phase 3. The effects of the proposed project will be defined in terms of the changes relative to the baseline condition characterized by the Phase 1 study. This ~~two-P~~ phase 3 study will provide information to satisfy Federal Energy Regulatory Commission (FERC) license application requirements specific to assessing expected incremental Project-related effects on the socioeconomic environment as specified in the applicable sections of 18 CFR Parts 4 and 16.

The Phase ~~3~~ study will address the following key questions related to estimating expected changes in the socioeconomic condition due to the differences between the proposed project and the current project:

1. Which major economic sectors will be affected and what would be the effects on those sectors?
2. How would the effects on economic sectors translate into changes in employment and earnings in the economies of the study region?
3. What would be the effects on population growth, and community services in the study area?
4. What would be the changes in market and non-market economic benefits and costs (i.e., described in monetary, non-monetary, and/or qualitative terms)?
5. How would the potential benefits and costs be distributed within and across regions in the study area (i.e., which societal groups would bear the burdens and who would reap the benefits)?

The discussion related to the ~~thirdsecond~~ phase of study is presented in draft form because the study specifics will depend upon the final description of the proposed project, including information related to the expected effects of the differences between the proposed project and the current project on resources in the study area. Such information will be forthcoming from other resource study teams. Thus, it is important to state that many of the details related to the

geographic extent of the analyses, the data and information requirements, and the analysis methods can only be finalized once the proposed Project and PM&Es have been defined. As a general rule of thumb, the study will use the best available information to support the analyses. Thus, where suitable quantitative information is readily available it will be utilized. Alternatively, the decisions to develop any new models, to extend existing models, or to conduct additional original survey work would need to be justified based upon the value of the expected information. The critical element of the phase 3 study process is that the socioeconomic workgroup will review the study specifics proposed by PacifiCorp before PacifiCorp proceeds with any in-depth analysis of the proposed Project and PM&Es.

7.2.2 Objectives

The phase 3 study is to assess the contributory effects on the socioeconomic condition in the study area of the differences between the proposed project and the current project.~~The second phase of the study is to assess the proposed project's contributory effects on the socioeconomic condition in the study area.~~ The study plan developed to efficiently meet this study objective and to address the key study questions includes the following analyses:

- Regional economic impact analysis to capture changes in local employment, output, and earnings in the study area due to the differences between the proposed project and the current project. A component of the regional economic impact analysis is the sector analysis, which defines the effect of the proposed project on major economic sectors (e.g., recreation and tourism, construction, commercial fishing, agriculture);
- Descriptions of the changes in other socioeconomic resources (e.g., population, community services) in the study area due to the differences between the proposed project and the current project; and
- National level economic benefit-cost analysis to capture the changes in net benefits to the public due to the differences between the proposed project and the current project.

The Phase ~~2~~3 objectives will be revised as necessary in the course of conducting the study.

7.2.3 Relicensing Relevance and Use in Decision-making

The results of this phase 3 two-phased study will provide information to satisfy Federal Energy Regulatory Commission (FERC) license application requirements specific to Project-related effects on the socioeconomic environment as specified in the applicable sections of 18 CFR Parts 4 and 16.

PacifiCorp will use the ~~two~~-phase ~~3d~~ study results to describe ~~the baseline socioeconomic condition and~~ the relationship between the differences between the proposed project and the current project as they relate to socioeconomic endpoints such as population, housing, economic development, local and tribal government revenues and expenditures, public services, infrastructure, water-based recreation and commercial and subsistence fishing. The analysis will be limited to potential incremental Project effects and will not provide a comprehensive model of the local regional, or national economies. Information from this study will be integrated as

appropriate with other recreation, cultural, and biological resource information about the study area to help [evaluate](#) ~~determine potential~~ project PM&E measures.

7.2.4 Methods and Geographic Scope

This study will conduct three primary analyses: (1) a regional economic impact analysis, (2) an analysis of changes in other socioeconomic resources, and (3) a benefit-cost analysis. These analyses are to assess the [expected effects of the differences between the proposed project and the current project as they relate to](#) ~~'s expected effects on~~ stakeholders in the region and to measure the aggregate economic effects. The methodologies of each analysis will vary, but the basic tasks are the same. These tasks are as follows:

1. Description of the proposed project in terms of changes from the current operation of the Project and related protection, mitigation, and enhancement measures and identification of the associated economic and socioeconomic measurement endpoints that are likely to be affected by the changes.
2. Identification of the geographic scope of the study area, and the sub-regions within the study area that are likely to experience different impacts. (See Section 7.2.4. for the broad description of the geographic scope.)
3. Identification of the pathways from the changes in project operations and protection, mitigation, and enhancement measures to economic and socioeconomic endpoints.
4. Identification of information needs, information resources, and gaps in data and development of solutions for meeting the data requirements and collection of data.
5. Review and analysis of the data [and information](#).
6. Presentation of methodologies and selection of the appropriate methodologies to use in evaluating potential [incremental](#) project effects and development of the model.
7. Application of the [methodologies](#)~~model~~.
8. Identification of key assumptions and constraints associated with each type of economic and socioeconomic analysis, including, for example, issues associated with making projections into the future using essentially static models.
9. Description of results and summarization of conclusions.

The primary basis of analysis is a comparison of the socioeconomic conditions “with” and “without” the potential changes due to the proposed project over the 30- to 50-year project life. After describing the proposed project and data sources, the following sections provide details on the remaining above tasks as they relate to the three separate economic and socioeconomic analyses.

7.2.4.1 Proposed Project Description

This section will describe the [changes due to the](#) proposed project that the study will evaluate. The socioeconomic study specialists will coordinate with the other resource study specialists to identify potential [incremental](#) Project effects with significant linkages to socioeconomic

resources. It also will be important to assess the extent to which such relationships can be disentangled from the non-Project factors that influence those same socioeconomic resources.

7.2.4.2 Identify and Review Existing Information

Data Sources

PacifiCorp will gather and review pertinent socioeconomic data and information for the study area (as described in Section 7.2.4.4 of this study plan). This study will rely on data obtained from dialogues with resource agencies, local and tribal government officials, and various members of the public as well as internet sources, public reports and data, published literature, and information obtained from the other Project resource reports, especially hydrology, recreation, water quality, cultural, and fishery resources. The types of data for each of the socioeconomic resources that will be developed are described in the following methods sections.

7.2.4.3 Socioeconomic Impacts (Draft)

~~After the baseline socioeconomic conditions have been defined during the Phase I study, the second-phase 3 study~~ will assess the nature and extent of the incremental proposed project's effects on socioeconomic these conditions by conducting three primary types of analyses. First is the regional economic impact analysis, including the analysis of the primary economic sectors directly affected by the changes due to the proposed project. Second is the analysis of other regional socioeconomic effects, and finally, the benefit-cost analysis is described third.

Regional Economic Development

Regional economic development relates to the health and viability of the local/regional economy, measured in terms of employment, output, earnings, and tax revenues. The purpose of the regional economic impact analysis is to provide a basis for assessing the different expected economic effects of the proposed changes to the current project on various interest groups, income classes, and economic units. Economic units are defined as regional or local economies that have a common economic bond and destiny. Interest groups include stakeholders in distinct sectors of the economy. The study will measure economic consequences of the proposed changes to the current project in terms that are most meaningful to these economic units and interest groups.

The economic perspectives of importance in this analysis are those of the region, sub-regions, income classes, and stakeholder groups so that the measurements reflect the narrow interest of such groups, ignoring the effects on others. The purpose of this analysis is to contrast economic gains and losses among various entities within the region of direct influence.

An essential component of the regional economic impact analysis is the sector analysis. The purpose of the sector analysis is to identify the sectors of the regional economy that the proposed changes to the current project are likely to affect and qualitatively describe or quantitatively estimate the expected economic changes in that sector. To the extent that the changes in the economic sector are quantified, these results are used as inputs in the regional economic impact analysis to assess the effects of changes in that sector on the economy of the region.

Examples of sectors that could be affected by changes from the current project operations and PM&Es include but may not be limited to the following:

- Marine commercial fishing, [Native American river commercial fishing, and Native American subsistence fishing](#)
- Recreation and ecotourism businesses (e.g., [ocean sport fishing, river sport fishing, white-water boating, recreational mining, and reservoir recreation](#)) that rely upon the Klamath River resources in the study area
- Irrigated agriculture that relies upon the Klamath Hydroelectric project for water supply
- Construction
- [Ecosystem Restoration](#)
- Municipal water [and wastewater](#) services

—Other?

Geographic Scope. The geographic scope of the sector analysis and the regional economic impact analysis depend on the spatial extent of the potential project's sphere of influence. The overall study area is defined below in Section 7.2.4.4. The purpose of this subtask is to verify the identity of the regions and sub-regions within this study area for the purpose of capturing the local economic impacts due to the [incremental changes to the](#) project.

Pathway to Economic Endpoints. This task will involve coordinating with the work of each study team to describe how the group of associated actions making up the proposed project (the hydrologic modifications, construction and operation, changes in water quality, and fishery resources) is likely to affect the regional and sub-regional economy within the study area. These actions will involve changes in expenditures (or revenues) that will provide data for input into models of the regional economies. The study will measure the following variables:

- Employment
- Output
- Earnings
- Tax Revenues

Linking [incremental](#) project impacts to the models of the local economy may, to some extent, depend on the definition of the proposed project. By way of illustration, a number of potential impacts that could occur at some point during the 30–50 year planning horizon include the following:

1. Stimulus of the construction industry during the construction phase of the project;
2. Availability and cost of water for irrigation agriculture;
3. Availability and therefore the value of the marine commercial fish catch;
4. Quality and quantity of recreation activities and, therefore, ecotourism-related revenues;

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- ~~5. Availability and cost of water supply for Yreka;~~ and
~~6.5. Mitigation and restoration expenditures designed to provide protection, mitigation, and enhancement measures.~~

The scope of the study assumes that sector analysis results and their associated linkages to the regional economic impact models will be through the variables identified in the Data Collection Section below.

The sector analysis is designed to estimate changes in total revenues for the sector in question and/or other measures of anticipated economic outcomes, such as rate of return on investment, earnings, employment and shifts in production among competing regions. Pathways to five potential economic sectors include:

1. Changes in the direct cost of constructing or removing facilities, changes in costs of operating and maintaining facilities, and changes in expenditures to restore or enhance the ecosystem are likely to be captured in the construction sector.
2. The potential project's hydrologic modifications and any changes in water supply available for irrigated agriculture can lead directly to changes in farm production costs and thus the behavior of farmers and total revenues for the agricultural sector.
3. The potential project's hydrologic modifications and changes in PM&Es can lead to ecosystem changes, such as fishery productivity, that lead to changes in behavior (e.g., commercial fish landings, recreational fishing trips) and total revenues or expenditures for the commercial fishing sector and recreation and eco-tourism businesses.
4. The potential project's hydrologic modifications can lead to reservoir system management changes that result in changes in lake levels and in-stream flow, which lead to changes in behavior (recreation and eco-tourism businesses) and total revenues or expenditures for the sector.
5. The potential project's hydrologic modifications can lead to changes in municipal utility costs and thus to changes in the behavior of municipal and industrial water supply consumers.

Inputs or Data Requirements. The task of data collection is to identify what information is needed, what information resources exist, what gaps in data are present, and then to develop solutions for meeting the data requirements. Specific information needs will depend upon the results from previously listed activities. The process for collecting the data will vary by sector. Data requirements will depend on the approaches adopted for estimating changes in total revenues and expenditures. Preliminary data requirements are identified for each of the economic sectors discussed below in the Model Development and Calibration Section. In each case, the data collection will distinguish construction periods from operation and maintenance periods so the analysis of impacts can be evaluated on that basis.

Model Development and Calibration. Because the sector analysis is a necessary step in developing the information to be entered into regional economic models, the sector models will be described first, followed by the regional economic impact analysis model.

Sector Analysis Models. Each sector may require a distinct approach for estimating potential changes in total revenues and other economic measures of impacts. This study would review the literature on approaches for the different sectors as well as specific models that may have been developed for these industries in the region. Existing sector models, which may be applicable to the study area, allow evaluations such as the following:

- **Construction Industry.** The proposed project may include a construction component. The changes in engineering cost information will be estimated by PacifiCorp.

To illustrate, the following is a list of information needs:

1. Changes in local employment due to construction and operation of new facilities and ecosystem mitigation/restoration activities;
2. Construction costs broken down by labor costs and material costs and by county within the region and outside the region;
3. Operations and maintenance costs broken down by labor costs and material costs and by within the region and outside the region;
4. Average number of employees in construction workforce over life of project or variable estimates, if average figures would be misleading;
5. Duration of the construction projects and thus the employment periods for the construction workforce (when would the projects commence and what are their expected completion dates?);
6. Expected number or percentage of construction workers who would be daily commuters and the percentage of these workers that will permanently relocate to the region to fill these jobs.
7. Total construction payroll;
8. Number of full-time employees who would be hired to operate the new facilities, when would they be hired and the percentage to be hired locally; and
9. The associated annual operations payroll.

The predicted effects of the proposed project on construction employment, revenues, and earnings will be estimated with the use of economic models using construction industry data typical in each region. The analysis of the economic effects of the project as a result of changes in the construction industry will be used in the regional economic impact analysis discussed below.

- **Irrigation Agriculture.** Agricultural models estimate the economic effects of input costs, input availability, and productivity on the irrigation agriculture industry. (Production cost changes and productivity will link directly to estimated changes in the quantity of water

available for irrigation.) This will show the effects of input costs, productivity, and product price changes on the level and value of production, levels of input use, and the profitability of irrigation agricultural production in relation to that of alternative enterprises relative to the baseline condition. This study will investigate the availability and suitability of existing models of irrigation agriculture in the region (e.g., models developed for the BREC Klamath River Irrigation Project.). Ideally, the models would account for the economics at the external margin (marginal acres or marginal farms) as well as median or typical farm circumstances. Such models also may indicate the regional distribution of agricultural production as a result of changes in the production cost for the relatively small percentage of farms that rely upon the Klamath Hydroelectric Projects for irrigation water. Changes in the value of production for these farms would link to one or more regional economic model sectors in order to estimate the regional impact of these changes.

Absent access to suitable existing models, alternative methods of characterizing economic impacts to this sector will be investigated, including a qualitative description of changes to this sector. Any quantitative results for the irrigation agriculture sector would likely become inputs to the regional economic impact analysis and the benefit-cost analysis discussed below.

- **Commercial Fishing.** It is assumed that potential [incremental](#) Project-related impacts on the commercial fishing industry are primarily limited to the coastal communities in downstream counties (i.e., Curry, Humboldt, and Del Norte). As with the sport fishery, these Project-related local impacts would depend on several factors, including: (1) projections for Project-related changes in the size and perhaps the composition (native vs. hatchery) of fish populations; (2) the timing of these changes; (3) relationships between fish populations, water quality, fishing effort (i.e., production functions), and harvest; and (4) changes in the management of the fishery (i.e., allocations among the tribal, sport, and commercial fisheries). Depending on the reliability and validity of the inferences, Project-related impacts will be assessed either qualitatively or quantitatively, the later using the IMPLAN model for the affected individual counties or county aggregates.

Specifically, PacifiCorp will investigate the availability of models linking these relationships to changes in landings that together with ex-vessel price provides estimates of commercial salmon fishing revenues, which is an input into the IMPLAN model. It will be important to adopt a methodology that accounts for shifts in effort (e.g., vessels, labor, processing plants) among the different fisheries as well as changes in total effort. Depending upon the nature and extent of the expected changes in the commercial fishery, a qualitative analysis may be sufficient to characterize the changes in this sector.

- **Recreation in the Project area and on the Klamath River downstream of Iron Gate Dam.** The analysis will begin with a representation of the recreation sector and its relationship to the water quality, water flow, and fishery quality factors that may change due to the proposed project [changes](#). Expenditures on whitewater rafting, angling, and other recreational goods and services tend to change in relation to changes in recreation visitor days and visitor trips. Therefore, changes in total expenditures in this industry will depend upon expenditure levels and changes in the recreation visits.

The socioeconomic specialists will coordinate with the recreation study specialists to obtain visitor expenditure information in their surveys of users and/or from interviews with local recreation outfitters and service providers. This information will be supplemented by expenditure data reported in government reports, public databases, and the empirical literature. The expenditure information will be used to estimate the economic impacts of changes in recreation expenditures on the recreation industry in general, and where possible to identify shifts among types of recreation activities that may point to the potential winners and losers within the industry. The expenditure categories include: (1) fees (such as outfitter fees, access fees, and other); (2) recreation supplies, materials, and services; and (3) gas, meals, and accommodations.

Information to support estimating potential Project-related changes in non-local recreation trips in the study area will be obtained from the recreation resources studies (Study Plans 3.1 and 3.2), from interviews with government officials and recreation support businesses, and from research reports and the empirical literature. These data will include visits by reservoir and Klamath River users who primarily engage in the activities that are potentially affected by the Project (i.e., shoreline day-users, recreational miners, campers, anglers, and whitewater boaters).

For both the upstream and the downstream counties, the existing literature will be used to evaluate the extent to which one can infer reasonable bounds on the changes in non-local recreation trips and expenditures that might result from potential Project-related changes in the existing condition. Such bounds would depend upon several factors including: (1) projections for Project-related changes in the size and perhaps the composition (native vs. hatchery) of fish populations as well as for water quality changes; (2) the timing of these changes; (3) relationships among fish populations, water quality, and recreation trips; (4) changes in the management of the fishery (i.e., allocations among the tribal, sport, and commercial fisheries). Similarly changes in whitewater boating activity levels and expenditures will depend upon project-related changes in flow conditions including the timing (i.e., time of day, days of the week) and seasonality. Changes in flow conditions could also affect recreation mining opportunities. Changes in reservoir management could affect reservoir recreation activities, and so on.

Depending on the reliability and validity of the inferences, [incremental](#) Project-related impacts will be assessed either qualitatively or quantitatively. To the extent that quantitative estimates are developed, they will be used in the regional economic impact analysis to assess the regional effects of the changes. Interpolations to the community level will be made where they can be supported by the available data-

- [Ecosystem Restoration. Ecosystem restoration and mitigation activities will be addressed in much the same way as was described above for the construction sector.](#)
- [Municipal and Industrial Wastewater Treatment. To the extent that water quality decreases due to the changes from the current project, this could affect the municipal and industrial wastewater treatment costs. If significant, these cost changes will be linked to a](#)

~~regional economic model sector (water supply and sewage systems) to evaluate the economic impact. Otherwise potential changes will be characterized in qualitative terms. **Municipal and Industrial Water Supply for the Communities.** The Project currently contributes to the water supply for the community of Yreka (i.e., approximately 16 cubic feet per second). Any changes in Project operations that would significantly affect this service will be linked to a regional economic model sector (water supply and sewerage systems) to evaluate the economic impact. Otherwise potential changes will be characterized in qualitative terms.~~

Regional Economic Impact Analysis Models. Regional economic development relates to the health and viability of the local/regional economy, measured in terms of employment, output, earnings, and tax revenues. The estimated changes in these quantities that are attributable to the proposed changes to the project will be forthcoming from the sector analysis. These analyses provide estimates of new injections of dollars into the local economy. Because of trade and production linkages in the economy, indirect, or secondary, economic impacts may result from the direct (or primary) changes captured in the sector analyses. For example, an increase in expenditures to construct a project facility requires an increase in expenditures for intermediate goods needed to meet that demand. These expenditures, in turn, create demands on other local industries. Alternatively, leakages are payments made to nonresidents for imported goods, materials, and labor. Payments to nonresidents are not returned to the local economy after they leave; as a result, they have no local impact. The IMPLAN model accounts for such leakages.

Because of the nature of the data, the analysis generally will be conducted at the county or multi-county level. However, to the extent that it is feasible, the analysis may include inferences on potential incremental Project impacts to the local communities.

The study team will assess the incremental project's regional economic impacts on employment, earnings, output, and tax revenue by using a regional input/output model, (i.e., IMPLAN). The model should allow evaluation of project impacts on the distribution of income among income classes. The I-O analysis will incorporate an area consisting of Klamath, Jackson, and Curry Counties, Oregon, and Siskiyou, Humboldt, and Del Norte Counties, California, and will be based on a change in final demands. If the expenditure data are divisible at the county level, and if there are compelling reasons to view results at the county level, separate models will be run for the individual counties. Otherwise, two or more of the counties may be aggregated to mirror the level of aggregation in the data and to capture the inter-county economic dependencies. The above section on Sector Analysis describes sectors of the economy directly affected by the potential proposed changes to the project.

Key Assumptions/Constraints. The sector analysis is constrained by the existence of sector behavioral models with appropriate linkages to the potential project hydrologic modifications and ecosystem changes and related costs of production influences on key economic sectors.

Potential changes in the Project or the future operation of potential PM&E measures also could affect the socioeconomic condition of Native American tribes that likely will only partially be reflected in the regional economic impact analysis. Historically, the natural resources of the Klamath River system contributed to the subsistence of the people of these tribes. Just as the historical decline in anadromous fish populations has diminished tribal reliance upon subsistence fishing and has negatively affected the socioeconomic condition of Native American tribes and

people, enhancements to the salmon fisheries, and other natural resources could lead to increased subsistence and thus an improved socioeconomic condition of the Native American tribes relative to the existing condition. PacifiCorp will gather data on subsistence fishing trends and projections from the tribes. In addition, the socioeconomic study specialists will coordinate with the tribes and the cultural study specialists to seek information from the tribes on the inter-relationships between natural resources, tribal cultures, and changes in the socioeconomic conditions of the tribes due to the proposed [changes to the](#) project.

Input/output models assume fixed coefficients and therefore overstate long-term consequences. For example, the use of the IMPLAN modeling tool limits the study to a static analysis that does not account for the evolution of the regional economy or that of particular industries over time. Nor does it account for competing demands for the inputs to production. In this case, the effect is that they will ignore the opportunity for workers to find other employment, for land to be used for alternative enterprises, and capital to be redirected to other investments. Therefore, it will be necessary to adjust the economic impact results to reflect the appropriate long-run re-employment of land, labor, and capital in the region.

These regional economy models are static and will not capture potential changes in the market due to the type of technological innovations that have emerged over the last 80 years. The pathways to economic effects were defined based upon illustrative alternative effects. If new information reveals that the project will induce other changes in the local or regional economy, researchers will adjust the scope of these studies.

Even with these limitations an I-O analysis using IMPLAN provides a level of analysis that is consistent with the requirements of FERC. The primary advantage of this approach is that it would clearly identify those counties in the study area that are likely to experience the greatest impacts from potential changes in the proposed project.

Results. The sector study will produce an analysis of the economic impact of the proposed [changes to the](#) project on each of the economic sectors discussed above. The outputs of the several sector analyses will provide insight regarding the impact of the project on the sector distribution and level of production, rates of return on investment, and changes in the input mix to production. The value of production changes will provide direct linkages to the Regional Economic Impact analysis models.

The purpose of the regional economic impact analysis is to provide a basis for assessing the different [expected](#) economic effects of the proposed [changes to the](#) project on various interest groups, income classes, and economic units. Economic units are defined as regional or local economies that have a common economic bond and destiny. Interest groups include stakeholders in distinct sectors of the economy. The study will measure [predicted](#) economic consequences of the [changes to the](#) proposed project in terms that are most meaningful to these economic units and interest groups.

The economic perspectives of importance in this analysis are those of the region, sub-regions, income classes, and stakeholder groups so that the measurements reflect the narrow interest of such groups, ignoring the effects on others. The analysis will contrast economic gains and losses among various entities within the region of direct influence.

The results will detail the [estimated](#) economic impacts on the regional economies in terms of earnings, employment, and value of production due to the proposed [changes to the](#) project.

Other Regional Socioeconomic Effects

The study would describe socioeconomic resource effects for each of the identified sub-regions within the study area. Such resources include the following:

- Population
- Housing
- Local government fiscal conditions
- Public services (police, fire, emergency personnel, schools)
- Infrastructure (transportation, utilities)
- Locations of businesses and households

Geographic Scope. The purpose of this section is to identify the communities in the project area that may experience varied socioeconomic effects.

Pathway to Socioeconomic Endpoints. The project will either directly affect socioeconomic resources or indirectly affect them through changes in other resources. The projected impact of the [changes in the](#) project on population, housing, local government fiscal conditions, public services (police, fire, emergency personnel, schools, etc.) will be assessed qualitatively or with the use of socioeconomic models integrated directly with the regional economic impact models. The focus of such analyses will be the areas of the greatest project impact.

Inputs or Data Requirements. This study will use data obtained from resource agencies, local government, and tribal officials, members of the public as well as internet sources, public reports and data, published literature, and information obtained from the other project resource studies.

Model Development. This study will focus on those socioeconomic factors that are likely to be influenced by the proposed [changes in the](#) project, including potential project mitigation and enhancement measures. This will serve to put project effects on such resources into perspective relative to the communities' broader concerns. Changes in the socioeconomic resources are evaluated relative to the baseline condition.

Once the baseline conditions have been defined in Phase 1, this step is to assess the nature and extent of the [incremental](#) project's effects on those conditions. This analysis will rely on the other resource reports and other data sources to describe the necessary relationships between the proposed [changes to the](#) project and the resources that will serve as inputs into the socioeconomic study. For example, any changes in construction employment may lead to changes in local populations and place increased demands on housing and public services. Also, construction activities may stress the local infrastructure. As an alternative example, changes in the suitability of the recreation opportunities in a given region will result in changes in the demands for local goods and services and potentially employment that may lead to changes in local populations. These socioeconomic effects are typically measured in connection with the regional economic modeling activity.

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The nature and extent of [potential incremental](#) Project impacts on the region will be assessed for each of the relevant aspects of socioeconomic resources, as follows (the scope of these assessments will be refined subsequent to completing the first phase analysis and to having a description of the proposed project):

Population. This aspect will address the extent to which the [changes in the](#) Project induces or could induce changes in the local population that could affect the region.

Housing. This aspect will evaluate the availability of local housing to accommodate any [incremental](#) Project-induced in-migration.

Local and Tribal Government Revenues and Expenditures. This section will rely on information from PacifiCorp to address increases or decreases in local taxes or fees paid by PacifiCorp because of the [changes to the](#) Project.

Public Services. This section will evaluate effects of potential changes in Project operations or facilities on local service providers for police, fire, emergency personnel, medical services, and schools.

Recreation Resources. The changes in resources to support recreation (especially boating, shoreline day-uses, camping, angling, mining, and whitewater boating) resulting from potential changes in Project operations or facilities in the study area will be described in the recreation resource report, as detailed in Study Plans 3.1 and 3.2. The socioeconomic study will incorporate those findings as appropriate. In addition, the socioeconomic study will describe the estimates of changes in visitor recreation patterns and expenditures resulting from potential changes in Project operations or PME measures. Finally, the socioeconomic study will report on the potential negative impacts of recreation activity to Native American tribes and people.

Infrastructure. Two types of infrastructure will be addressed in the socioeconomic study: utilities (water, wastewater, electricity, etc.) and transportation (roads, highways, and bridges).

Utilities. This section will assess effects of the potential changes in Project operations or facilities on services and costs of water and stormwater, wastewater treatment, solid waste disposal, electricity, and natural gas. The assessment will include a qualitative discussion of how Project costs may affect rates and rate setting as well as a discussion of the existing contract PacifiCorp has with the U.S. Bureau of Reclamation, the Link River Agreement. While the existing contract has a strong nexus to the existing FERC license it is unknown what if any agreements will be made going forward between PacifiCorp and the federal government.

Transportation. PacifiCorp will analyze truck traffic generated by potential changes in Project operations or facilities that will be added to the future traffic estimates and the effects evaluated using standard roadway capacity analysis. PacifiCorp will also address the changes in recreation travel patterns as a result of the Project, using information on changing recreation visitation as derived by the recreation resource studies.

Environmental Justice. This section will examine [differences between the proposed and current project as they relate to Project-induced](#) environmental, economic, social, or health effects on

low-income and/or minority populations living in the study area to determine any disproportionate placement of burden on such groups.

Locations of Businesses and Households. This section relies on information from the land use (Study Plan 4.1) and the recreation studies (Study Plans 3.1 to 3.5), as well as PacifiCorp, to ascertain whether the Project [changes](#) would displace or otherwise physically affect any businesses or residences. If such effects appear likely, PacifiCorp would develop acquisition procedures, relocation assistance, and other mitigation alternatives.

Key Assumptions/Constraints. The socioeconomic study specialists will coordinate with the tribes and the cultural study specialists to seek information from the tribes on the inter-relationships between natural resources, tribal cultures, and changes in the socioeconomic conditions of the tribes due to the proposed [changes to the current](#) project.

Results. The results of the study will consist of an evaluation of [incremental](#) project impacts on socioeconomic conditions.

Net Economic Benefits

Benefit-Cost Analysis identifies and evaluates the benefits and costs related to the [differences between the proposed project and the current project](#). This analysis is the standard economic method for determining whether the benefits exceed the costs and the action is in the public interest (i.e., improves the economic efficiency in the utilization of societal resources). This analysis is more complete than the Regional Economic Impact Analysis in part because it includes key non-market values such as recreation. The purpose of the benefit-cost analysis is to identify and describe the [expected](#) market and non-market economic benefits and costs associated with the proposed [changes to the](#) project. To the extent that such effects are quantified in dollar terms, they can then be aggregated to compute net economic benefits. In addition, some net benefits can be described in qualitative terms and/or quantitative terms using non-monetary metrics (e.g., ecological metrics), so that they, too, can be factored into the assessment of economic efficiency. Market and non-market effects may include (but are not limited to) the following resources:

- Power Production
- Market, non-market and indirect effects from changes in ecological services (e.g., restored sport, commercial and Tribal fisheries; restored aquatic habitat, changes in property values, changes in flood moderation, changes in municipal water supply, changes in irrigation water supply)
- Real resource costs associated with constructing, operating and maintaining new facilities and/or removing or altering existing facilities
- Real resource costs associated with changes in Project operations
- Real resource costs associated with potential PM&Es

The list of potential project benefits and costs will depend on clear descriptions of the proposed project.

Geographic Scope. The benefit-cost analysis will attempt to capture the significant economic effects of the potential project [changes](#) to make a determination on net economic benefits. The analysis will take a national perspective for purposes of determining net economic benefits.

Pathway to Economic Endpoints. This task is to identify the linkages between the proposed project and the resources that would be affected by [the differences between the current project and the proposed project](#). The above list includes examples of economic benefits and costs associated with potential Klamath Hydroelectric Project. The primary Klamath Hydroelectric Power Project purpose is to supply power. In addition, hydroelectric power production involves the utilization of natural resources and thus alters the ecological service flows that are generated by those natural resources. This task is to conceptually trace through the hydrologic-ecological-economic linkages to describe how the proposed project can lead to changes in market, non-market and indirect effects relative to a continuation of the current Project and PM&Es. Some of the economic values associated with this list are market commodities and others are not. The type of sector models discussed in the last section will allow assessment of the benefits and costs of the project [changes](#) on the market values (commercial fishing, agriculture, and water supply). These models allow translation of listed impacts into changes in consumer and producer surplus—a translation required for benefit-cost analysis that is a step beyond the analysis of impacts. In addition, Table 1 in the Model Development section below shows alternative methods for evaluating the [anticipated](#) economic effects from changes in the ecological services due to the proposed [changes to the](#) project. The project may avoid impacts on particular resources, negating the need for economic analysis in that instance.

Inputs or Data Requirements. The specific data requirements will depend upon the results of the pathway analysis and the approaches adopted for estimating changes in producer and consumer surpluses or otherwise characterizing the [expected](#) economic effects due to the proposed [changes to the](#) project. A preliminary description of data needs is described below for a subset of potential effect categories.

- **Power Production Data Requirements.** For the changes in power production due to the proposed project (measured relative to power production under the existing license) information is needed on:
 - Most likely alternative source of power
 - Estimate of the cost savings relative to the most likely alternative source of power.
 - Estimate of pollutant/emission units avoided due to the potential Project
 - Cost per unit of emission reduction

Any such cost-savings represent an economic benefit of the project. They may be described in qualitative and/or quantitative terms.

Information is also needed on the real resource costs associated with the changes in power production including the following:

- Constructing, operating and maintaining new facilities and/or removing or altering existing facilities;
- Changes in Project operations
- Changes in PM&Es
- Changes in unmitigated ecological service losses.

These real resource costs may be described in quantitative and/or qualitative terms. Data needs associated with direct expenditures related to changes in the Project facilities, operations or PM&Es were listed in the Sector Analysis section of this study plan.

- **Market, Non-market and Indirect Effects of Changes in Ecological Services.** Besides producing power, hydroelectric projects can provide water supply (e.g., municipal and industrial water supply and irrigation water) and flood moderation services. Although the Klamath Hydroelectric Project was not designed to provide these services, it does provide a limited quantity of each of these services. This task would identify the data needs associated with evaluating the expected changes in such services due to the proposed [changes to the project](#).

As was mentioned above, hydroelectric projects can also affect other natural resources, especially the river. Potentially affected ecological services include in-stream flow and water quality and the biological resources that depend upon these attributes. Potential economic goods and services affected by changes in the current Project and PM&Es include changes in recreation opportunities (i.e., especially whitewater boating, and sport fishing), tribal fishing opportunities, commercial fishing output, cultural resources, passive use values, and property values. Again, the specific data needs will depend upon the method of analysis. Table 7.2-1 identifies methods of analysis corresponding to the different types of effects.

Model Development. This section will define benefits and costs, describe the theoretical basis for measuring them and suggest the appropriate valuation methods. PacifiCorp will measure benefits and costs against the current operation of the project under its existing license and the current waterway environment as the baseline existing project. Economic benefits are usually assessed by completing a separate valuation of each project effect. An example of economic valuation methods for selected potential project benefits are identified in Table 1. Column one identifies the resources potentially affected by the project. The economic benefits associated with such changes are listed in Column two. Often the same beneficial effect, such as sport fishing, can be affected by multiple resources. Therefore, approaches that capture the combined influence of multiple resource changes may be required to avoid double counting of benefits. This cautionary note also applies to the third column, which identifies valuation methods to estimate the economic benefits.

This analysis will quantify the impact on resources that can be measured in dollars by translating them into a benefit-cost accounting framework. It will analyze data that cannot be measured in dollars by qualitative analyses and/or analysis methods that quantify effects in units other than dollars (e.g., ecological units).

Table 7.2-1. Summary of Resources and Associated Benefits of the Ecological Services

Resource	Benefits	Valuation Method
Water Quality	Market Commodities <ul style="list-style-type: none"> • Guided Recreation/ecotourism • Fish (commercial fishing) Non-Market Commodities <ul style="list-style-type: none"> • Recreation (sport fishing, near shore recreation, swimming) • Aesthetics (property values) Indirect: Ecosystem Services <ul style="list-style-type: none"> • Aquatic habitat • Other? Passive Use values	<ul style="list-style-type: none"> • Market Supply and Demand • <i>Ex-vessel landings and prices</i> • Recreation demand (travel cost demand, random utility models) • Stated preference • Hedonics • Benefit Transfer • Stated preference • Habitat equivalency analysis • Stated preference • Benefit transfer
Fisheries	Market Commodities <ul style="list-style-type: none"> • Fish (commercial fishing) Non-Market Commodities <ul style="list-style-type: none"> • Sport fishing • Subsistence Fishing Passive use values	<ul style="list-style-type: none"> • Market Supply and Demand • Recreation demand (travel cost demand, random utility models) • Stated preference • Hedonics • Benefit Transfer • Sated preference • Benefit Transfer
Hydrology (Instream flow, water quantity, water levels)	Market Commodities <ul style="list-style-type: none"> • Fish (Commercial fishing) Non-Market Commodities	<ul style="list-style-type: none"> • Market Supply and Demand

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Table 7.2-1. Summary of Resources and Associated Benefits of the Ecological Services

Resource	Benefits	Valuation Method
	<ul style="list-style-type: none"> • Recreation opportunities (white water boating, flat water boating, sport fishing, near shore recreation) • Subsistence fishing • Aesthetics (Property values) <p>Indirect Ecosystem Services</p> <ul style="list-style-type: none"> • Irrigation • Flood Control • Water supply • Sediment trapping • Other? <p>Passive Use Values</p>	<ul style="list-style-type: none"> • Recreation demand (travel cost demand, random utility models) • Stated preference • Hedonics • Benefit Transfer <ul style="list-style-type: none"> • Production function (cost savings) • Averted behavior • Stated preference • Habitat equivalency analysis <ul style="list-style-type: none"> • Stated preference • Benefit transfer
Terrestrial	<p>Market Commodities</p> <ul style="list-style-type: none"> • ? <p>Non-Market Commodities</p> <ul style="list-style-type: none"> • ? <p>Indirect Ecosystem Services</p> <ul style="list-style-type: none"> • ? 	<ul style="list-style-type: none"> • ? <ul style="list-style-type: none"> • ? <ul style="list-style-type: none"> • ?
Visual/Aesthetics	<p>Non-Market Commodities</p> <ul style="list-style-type: none"> • ? 	<ul style="list-style-type: none"> • ?
Cultural	<p>Non-Market Commodities</p> <ul style="list-style-type: none"> • Cultural enhancements • Cultural recreation/education opportunities 	<ul style="list-style-type: none"> • Recreation demand (travel cost demand, random utility models) • Stated preference • Hedonics • Benefit Transfer

Table 7.2-1. Summary of Resources and Associated Benefits of the Ecological Services

Resource	Benefits	Valuation Method
	Tribal Values Passive Use Values	<ul style="list-style-type: none"> • Ethnographic study • Stated Preference • Benefit Transfer
Recreation Facilities/Access	Non-Market Commodities <ul style="list-style-type: none"> • Recreation Opportunities 	<ul style="list-style-type: none"> • Recreation demand (travel cost demand, random utility models) • Stated preference • Benefit Transfer

The economic cost analysis is the opportunity cost to society of diverting resources away from the production of other valued goods and services. The initial step in a cost assessment is similar, no matter which approach is ultimately selected. This step involves modeling or otherwise predicting the project's effect on the behavior of private industry, individuals, and governments. The costs are then modeled using one of four approaches:

1. Direct cost method;
2. Partial equilibrium analysis;
3. Multi-market models; and,
4. General equilibrium analysis.

The economics study team will describe these valuation methods and recommend a cost estimation method for each effect ~~due to changes in~~ of the project. For example, costs of the project related to constructing, operating and maintaining facilities will likely be estimated using the direct cost method, which relies on standard engineering-cost-estimation methods. PacifiCorp likely will estimate all other costs (by using a partial equilibrium approach).

Key Assumptions/Constraints. The benefit-cost analysis is constrained by the existence of behavioral models with appropriate linkages to the potential project hydrologic modifications, ecosystem changes, and cost and productivity estimates from various other studies.

It is not expected that all effects will be quantified in dollars.

Generally, the results of the benefit-cost analysis are sensitive to the choice of discount rate. EPA recommends a rate of 2% to 3% for public projects as this rate is believed to most closely approximate the consumption rate of interest (U.S. EPA, 2000). Office of Management and Budget recommends a 7% rate, as an estimate of the average pre-tax rate of return generated by private sector investments (OMB, 1992). The current U.S. Army Corp of Engineers policy requires a 6 1/8% discount rate.

Results. The benefit-cost analysis will produce measures of the net economic benefits of the proposed [changes to the](#) project. The study team will estimate the net benefits from a national point of view. Net benefits will be characterized using a combination of monetary and non-monetary units as well as qualitative terms. The discussion will include information related to how the benefits and costs are distributed among identifiable sub-groups of the population.

7.2.4.4 Geographic Scope

The geographic scope of the socioeconomic analysis is determined by the Project's sphere of influence on the socioeconomic environment. Thus, the Phase 1 study:

- Identifies a relevant study area for assessment of impacts
- Identifies potentially affected communities and potentially relevant ordinances.

The preliminary study area for the socioeconomic analysis includes Klamath, Jackson, and Curry Counties in Oregon and Siskiyou, Humboldt, and Del Norte Counties in California, as these are the counties that contain the Project boundaries and/or whose economies, local services, and human resources are potentially affected by the proposed [changes to the](#) project. Even within these counties, the nature and extent of the Project effects that can be included in the socioeconomic study may be limited by the study areas of the other resource studies that provide inputs into the socioeconomic analysis.

Readily accessible socioeconomic data will be collected and presented for two additional regions within the above mentioned State and County boundaries. The regions are comprised of two corridors extending from the Link River Dam down the Klamath River to the Ocean, at which point they will spread along to the coast terminating at the boundaries of the Klamath Management Zone (Humboldt Mt, OR and Horse Mt/Shelter Cove, Ca). One corridor will extend five miles on each side of the river and five miles inland at the coast. The other region will extend up to fifty miles each side of the river and up to fifty miles inland along the coast. Where possible interrelationships between changes in Project operations and PM&Es and the socioeconomic factors pertinent to these regions will be described.

PacifiCorp is conducting a limited study of river-related recreation issues downstream of Iron Gate dam. This study will include an evaluation of impacts of flow releases from Iron Gate dam on boating and angling opportunities immediately downstream of Iron Gate.

PacifiCorp is studying the feasibility of and potential options for reintroducing anadromous fish populations to areas upstream of Iron Gate dam, as well as potential enhancements to existing anadromous fish populations below Iron Gate dam. The scope of the Phase [2.3](#) socioeconomic analyses will depend on the results of the fishery resource studies and the availability of information related to the relationships between changes in fish populations and changes in recreational, subsistence, and commercial fishing activity. PacifiCorp will consider adjustments in the study area as needed based on the extent of identified Project impacts that result from the analyses described in the hydroelectric project and other relevant (e.g., fisheries, recreation) resource studies, and the development of PME measures.

7.2.5 Relationship to Regulatory Requirements and Plans

The socioeconomic study will provide the information necessary to satisfy FERC license application requirements specific to Project-related incremental effects on the socioeconomic environment as specified in the applicable sections of 18 CFR Part 4 and 16.

7.2.6 Products, Maps, and Reports

To keep interested parties apprised of study status, study updates will be provided to the Socioeconomic Work Group at regularly scheduled meetings. At the conclusion of the studies, a Final Technical Report on socioeconomic resources will be produced that describes the approaches, methods, results, and conclusions of the studies. PacifiCorp plans to post the Final Technical Report on the Project Web site so that it can be easily retrieved and reviewed by interested agencies and stakeholders.

7.2.7 Schedule

The timeline and milestones for this study are as follows:

Characterize existing socioeconomic conditions	Winter 2001- Winter 2003
Coordinate with the other study groups and gather data on project effects	Spring 2003 – Early Winter 2004
Develop Final Technical Report	Late Winter 2004

7.2.8 Additional Considerations

7.2.9 References

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7.2.10 Glossary for the Socioeconomics Study Plan

Benefit-Cost Analysis: an accounting framework designed to characterize the expected economic outcomes of a decision to allocate scarce economic resources, in the form of benefits and costs to each component part of the economy, and summed to determine whether or not total benefits exceed total costs

CGE Model (Computable General Equilibrium): a general equilibrium mathematical representation of an economy; a formulation of the interrelationships of the various sectors of an economy that depends on well-functioning markets (no surplus or shortages) and where responses to market price changes are accounted for

Consumer Surplus: the difference between the amount of money one would be willing to pay for a given quantity of a good or service and the price required by the market, hence the fullest measure of the benefit one receives from having or consuming the good or service

Discount rate: the rate at which future economic values are reduced to make them economically equivalent to today's value; a rate used to convert a future value to present value

Ecotourism: tourism that focuses on the enjoyment of wildlife and other ecological resources

ESA: Endangered Species Act

EPA: U.S. Environmental Protection Agency

General equilibrium analysis: an economic analysis of a particular market where effects on related markets are fully accounted for

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Input-Output Model: a special form of a general equilibrium mathematical representation of an economy; a formulation of the interrelationships of the various sectors of an economy that depends on well-functioning markets (no surplus or shortages) but where responses to market price changes are not accounted for.

Net Environmental Benefit Analysis: an assessment of the impact of an economic decision on flow of ecological services provided by natural resources

Opportunity Costs: the value of the opportunity foregone by the chosen economic decision, such as the value of the job given up (foregone) when choosing one's current job

Partial equilibrium analysis: an economic analysis of a particular market where effects on related markets are ignored

Producer Surplus: the difference between the amount of money it would cost to produce a given quantity of a good or service and the price which is available in the market, hence the fullest measure of the benefit one receives from producing the good or service

[Protection, Mitigation, and Enhancement measures: PM&E measures will be expressed in the new license in Articles that define the affected resources and describe measures to be taken during the term of the new license.](#)

Regional Economic Impact Analysis: economic analysis of individual economic regions, such as a county, city or metropolitan area, made up of all the individual sectors of the economy, and accounting for the interrelationships among the sectors

Sector Analysis: economic analysis of individual components or sectors of the economy, such as agriculture, commercial fishing or municipal water supply services

Socioeconomic Analysis: analysis of the provision of public goods and services such as public schools, roads, and other government services that contribute to the economic well-being of the community, and of equity considerations of the distribution of economic benefits among various classes of people