

# **Irrigated Lands Regulatory Program EIR**

## **Draft Economic Analysis Approach**

### **February 2010**

This document describes the Central Valley Water Board's proposed approach for conducting an economics analysis for a Long-term Irrigated Lands Regulatory Program. The Central Valley Water Board in collaboration with stakeholders has developed a series of proposed long-term program alternatives that will be evaluated using the approach proposed below. For information regarding the long-term program and the proposed alternatives see:

[http://www.waterboards.ca.gov/centralvalley/water\\_issues/irrigated\\_lands/long\\_term\\_program\\_development/ilrp\\_longterm\\_alts\\_final.pdf](http://www.waterboards.ca.gov/centralvalley/water_issues/irrigated_lands/long_term_program_development/ilrp_longterm_alts_final.pdf)

#### **Overall Study Objectives and Approach**

As depicted in Figure 1, the analysis of economic (and fiscal) effects for the Long-term ILRP focuses on addressing the following three analytical questions:

- How much is currently being spent annually by growers, landowners, and administering entities in the Central Valley on compliance with the Irrigated Lands Regulatory Program (ILRP)?
- What are the expected additional costs, both to growers and administering entities, of compliance with the Long-term ILRP alternatives?
- How is imposition of these additional costs expected to affect the economic viability of farming in the Central Valley?

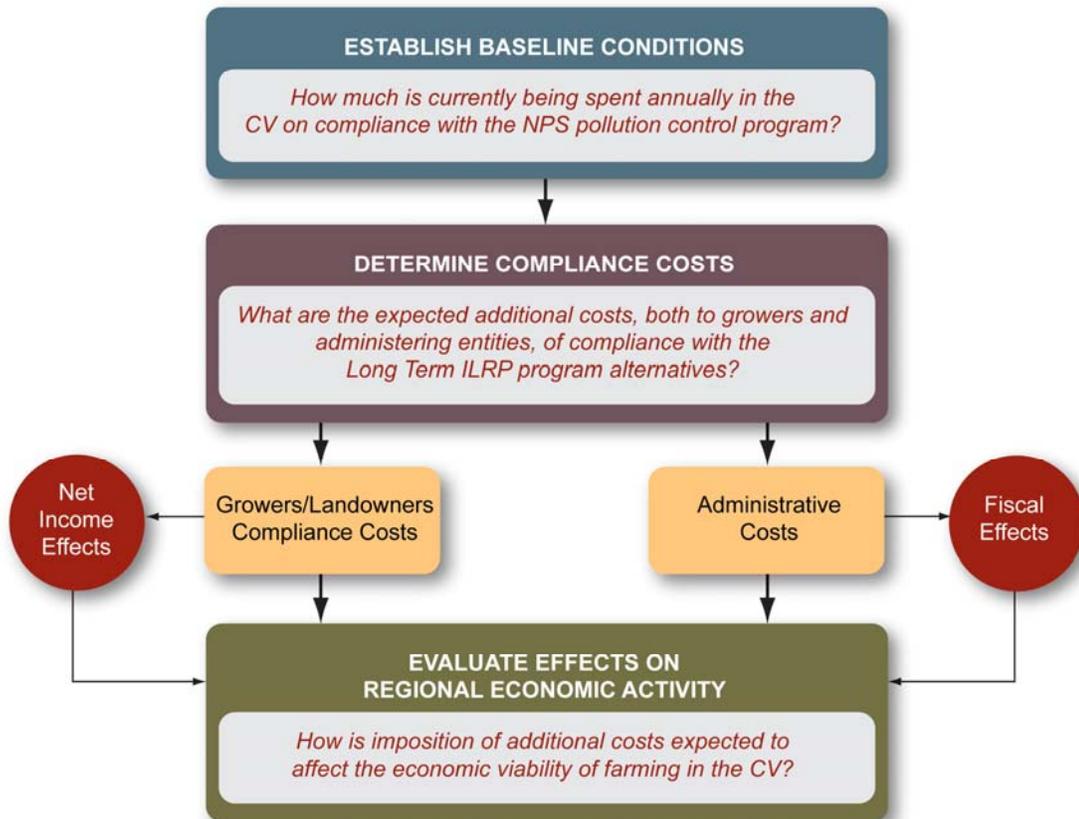
To address these questions, we will conduct an assessment of four study components: compliance costs, net income effects on growers and landowners, potential impacts on regional farm economies, and effects on government entities associated with administering the program.

Baseline conditions on compliance costs (i.e., how much has been spent to date on implementing the program) will be characterized using information already collected and compiled for the Existing Conditions Report. Evaluating program alternative effects will involve assessing the incremental costs to growers and landowners of new compliance actions. In some alternatives, new compliance actions are expected to include the implementation of additional management practices to protect surface and groundwater. The program alternatives in essence provide different ways to encourage widespread implementation of management practices and include different organizational structures to attain this. The alternatives vary with respect to lead responsibility to oversee the program (Regional Board or other lead entity), and grower regulatory responsibility (e.g. preparing water quality plans, record keeping, changes in surface water monitoring practices, and groundwater monitoring).

The economic analysis will be based on the following alternative-specific assumptions:

- Alternative 1 is the current management practices framework.
- Alternative 2 would be similar to the current framework for surface water, but would include groundwater management practices.

**Figure 1**  
Economic Analysis Approach to the ILRP



- Alternative 3 would lead to implementation of more widespread practices than Alternatives 1 and 2 because all growers would be required to develop a farm plan; regardless of whether water quality problems have been identified. Under Alternatives 1 and 2, management practices plans would be required where water quality concerns exist.
- Alternative 4 would also lead to more widespread practices, in reference to Alternatives 1 and 2, through the development of individual farm plans. Under this alternative, a tiered approach would be used to target known areas of concern. Alternative 4 would include nutrient management and wellhead protection. Nutrient management plans would be prepared for vulnerable areas (e.g., areas with identified nitrate problems). Alternative 4 would allow for regional monitoring.
- Alternative 5 would lead to more widespread practices than Alternatives 1 and 2, and would include nutrient management and wellhead protection for all growers. Individual surface and groundwater monitoring would be required under this alternative.

### **Estimation of Management Practices Implementation**

Potential economic impacts associated with grower implementation of management practices will be estimated for each alternative. The process for estimating probable management practices implementation in each alternative is summarized below. Changes in overall management practices would be estimated from the baseline condition. Baseline practices would be those that are in existence already, or would likely be implemented regardless of long-term ILRP requirements.

#### ***Alternatives 1 and 2***

In Alternatives 1 and 2, regional management plans would be developed and implemented where water quality concerns exist. Management practices would be implemented in order to achieve water quality goals (Basin Plan water quality objectives). The analysis of compliance costs and associated effects from implementing practices involving surface waters will be focused on the 13 (out of a total of 30) watersheds where impacts (i.e., water quality problems) have been identified and/or where water quality management plans have been required under the current program. Probable suites of management practices likely to be implemented will be estimated based on constituents of concern and hydrologic basin characteristics.

The information that will be used to estimate the types of groundwater quality management practices likely to be implemented includes:

- The attached figure showing areas with wells containing high nitrate levels
- Land use information (e.g., the irrigated lands program would only apply to irrigated lands)
- Vulnerable groundwater areas (see attached figures depicting Department of Pesticide Regulation (DPR) Groundwater Protection areas and State Water Board Groundwater Vulnerability Areas)

#### ***Alternatives 3-5***

Where all growers would be required to develop farm water quality management plans (Alternatives 3, 4, and 5), growers would be developing and implementing practices to achieve

management measures or goals. Management measures that will be used to characterize or estimate the types of practices that growers would be applying include:

- Minimize waste discharge offsite in surface water
- Minimize erosion
- Work to match nutrient application to predicted crop uptake
- Implement wellhead protection measures
- Minimize deep percolation of waste

Alternative 4's proposed tiering scheme and Alternative 5's universal requirements for certified nutrient management plans would also be considered in the estimation of probable management practices. As an example, probable suites of practices will be identified that would be designed to achieve the above measures. These suites of practices will be bundled based on reducing the flow path of constituents of concern (e.g., pesticides, nutrients) considering the differing environmental characteristics of the three Central Valley hydrologic basins -Sacramento River Basin, San Joaquin River Basin, and Tulare Lake Basin.

Although the study area includes the entire Central Valley, findings will be reported by major hydrologic basin.

## **Economic Analyses**

The economic analysis includes three analytical components:

1. An analysis of compliance costs, both to landowners (private sector costs) and government entities (public sector costs);
2. An analysis of net income effects on growers; and
3. An assessment of impacts on regional economies.

Compliance Costs. Conceptually, analysis of compliance costs involves estimating the incremental (marginal) costs incurred by businesses and individuals associated with implementing a regulatory action. In the case of the ILRP, these costs would include:

- Additional on-farm costs that growers would incur to be in compliance with the regulations (additional monitoring, reporting, and implementing best management practices)
- Administrative costs to entities (government agencies and non-governmental entities such as coalitions and agricultural districts) potentially responsible for ensuring that the regulations are implemented

Section 13141 of the California Water Code identifies the need for analyzing compliance costs and funding sources of new regulations. For the ILRP analysis, we will estimate the potential range of costs to be incurred by growers and landowners associated with implementing compliance actions that are required to ensure that water quality is improving. These compliance actions are described in Table 1. Unit costs for these actions will be specified in

terms of \$ per acre, or on a \$ per field or per landowner basis. Data sources to be considered in developing these costs include:

- Groundwater monitoring costs - CALFED Appropriate Measurement, USGS GAMA program, Department of Pesticide Regulation Groundwater Protection Program, Central Valley Water Board Dairy Program, Department of Public Health, local groundwater management plans
- Farm plan preparation costs – applicable information from: NRCS EQIP application preparation, State Water Board Stormwater Program, Central Coast Water Board irrigated lands program
- Administrative costs - existing program information (Confined Animal Facilities Program (Dairies Program), State Water Board Stormwater Program)
- Tracking costs - information on the costs to maintain existing data sets, other Water Board Programs, California Agricultural Commissioner information, coalitions
- Surface water monitoring costs – coalitions, Surface Waters Ambient Monitoring Program (SWAMP), USGS
- Management practices costs - NRCS , UC Davis, other available information

Table 1 also provides an initial assessment of management practice “intensity” for each of the alternatives. These intensity levels are subject to revisions as cost information is gathered and analyzed. The levels will be converted to compliance costs based on application of the range of costs to be developed for each action.

In some cases, growers would implement measures that are not intended to comply with water quality needs but meet various different objectives. For example, when a grower switches from surface irrigation that has surface runoff to a pressurized system without surface runoff there may be some water quality benefit. The change in practice may be to achieve an agronomic or labor purposes oriented objective but the practice would also have some water quality benefit. These types of actions will be identified and where possible quantified.

One issue that needs further consideration relates to feedback from monitoring. Future surface or groundwater monitoring under the chosen alternative may identify the need for implementing new water quality management practices. The type (and costs) of additional management practices needed in areas where water quality impacts are identified is highly uncertain at this point. Assumptions concerning the extent to which monitoring of surface or ground waters is expected to lead to implementing additional management practices will be utilized to provide potential cost ranges for each of the alternatives. These assumptions will be based on information such as: whether data are available for a particular area, results of sampling, problems identified in nearby watersheds, etc.

**Table 1. Description of compliance actions and levels of intensity**

Compliance Actions (that have cost implications)	Description of Action and Intensity Ranges
<b>Private Sector Costs</b>	
1. Water quality management plans	Document preparation to describe management practices to meet water quality objectives or management goals. Low intensity would equate to the regional management plans described in Alternatives 1 and 2; moderate intensity would be what is required for a Farm Water Quality Management Plan (FWQMP) –Alternatives 3; and high intensity would be what is required under Alternatives 4 and 5, with certified nutrient management plans and wellhead protection measures.
2. Groundwater monitoring	Action is to collect information. Low intensity limited to what is in the individual FWQMP or regional third-party developed groundwater management plans with minimal to no sampling required. Moderate intensity would be local groundwater management plan that has monitoring or regional intensity as described in Alternative 4. High intensity would be requirements for Alternative 4 tier 3 operations or Alternative 5 monitoring at the individual field level.
3. Surface water monitoring	Action is to collect information. Low intensity limited to what is in the individual FWQMP for Alternative 3 with minimal to no sampling required. Moderate intensity would be the regional monitoring proposed in Alternatives 1 and 2. High intensity would be individual monitoring proposed for Alternative 4 tier 3 operations and Alternative 5.
4. Reporting/tracking	Action is to report information. Low intensity with with participation in regional monitoring efforts (application, management practices tracking). High intensity with high individual data requirements and reporting (e.g., Alternative 4’s tier system, and the individual nutrient tracking required under Alternatives 4 and 5).
5. Education	One level - 15 hours under Alt 4.
6. Implementation of management practices	Action is to improve water quality. Low - education and chemical use management. Moderate - regional practices. High - individual field practices.
<b>Public Sector Costs</b>	
1. Inspection/determination of compliance	Action is to determine compliance. Low – would be no required inspection program (Alternatives 1 and 2). High – proposed inspection program under Alternatives 3, 4, and 5.
2. Reporting/tracking	Action is to determine compliance. Low – regional water quality data and management plan reports (Alternatives 1 and 2). Moderate – individual farm practices and plan review under Alternative 3. High – individual water quality data, management plan reports, nutrient tracking under Alternatives 4 and 5.
3. Overall program administration	Action is to implement program. Low – third-party regional surface water program (Alternative 1). Moderate – third-party surface and groundwater program (Alternative 2). High - individual field effort (Alternatives 3-5).

Another uncertainty is associated with the information available to estimate the proportion of an area (watershed or subbasin) that would need to comply under some of the alternatives. For example, “tiers” characterize the threat to water quality under Alternative 4; we anticipate developing different scenarios to address this issue.

Net Income Effects. The analysis of net income effects considers the impact of incurring additional operating costs on profitability. Potential cost savings (e.g., installing a micro-irrigation system might reduce a grower’s costs for water, fertilizer and labor) and potential revenue increases (e.g., a grower may realize increased revenue due to crop production increases) are evaluated in conjunction with the incremental costs for compliance and implementing management practices to determine the net effect on grower income.

For the ILRP analysis, we will use the Central Valley Production Model (CVPM) and its farm production budgets (or the Statewide Agricultural Production [SWAP] model developed at U.C. Davis and currently being adopted by DWR) to assess the effect of incurring additional costs on net returns to agriculture, and also on the status of lands currently in production. We anticipate using farm budgets representative of different categories of growers (e.g., based on crop type, sub-region, and reliance on groundwater or surface water). Cost estimates developed in the cost compliance task above will be incorporated with operating costs identified in farm budgets to assess potential effects on production and profitability.

Issues to be resolved for the analysis include:

- Determining the appropriate regional breakdown and grower categories. Considerations will include surface water conditions, groundwater conditions, and current crop mix and irrigation methods;
- Developing a defensible approach to assess financial viability or hardship for affected growers. Wide variation in conditions among growers implies that a single “threshold” is not appropriate. Rather, a combination of quantitative and descriptive analysis will be used to compare alternatives;
- Developing the impact metric(s) and significance criteria. Both quantitative and descriptive metrics will be considered; and
- Assessing the availability of federal and state grant and loan money (including NRCS EQIP) to assist growers and districts with compliance costs. This will affect the net revenue implications of alternatives.

Economic Impacts on Local, Regional, and State Economies. Analysis of economic impacts focuses on identifying expected changes in economic activity associated with a proposed regulation, as measured by industrial output, jobs, and personal income. These effects are magnified at the local level and within specific targeted industries (e.g., agriculture) when regulations are targeted on industries that comprise key sectors of the local (or regional) economy. Because potential job losses or earnings reductions are visible effects of a regulation, analyzing economic impacts on local regional and state economies resulting from regulatory changes is often conducted. Potential *increases* in economic activity in sectors

associated with increased business activity (e.g., additional spending on irrigation systems) also need to be considered. The costs of regulatory compliance for small businesses are of particular concern.

For the ILRP analysis, we will use the IMPLAN input-output (I-O) model to evaluate potential changes in regional economic activity. Originally developed by the USDA Forest Service to assist with land and resource management planning, the IMPLAN I-O model is a widely used model employed to assess the regional economic impacts of private and public projects. The regions for analysis will correspond with the three hydrologic basins, each consisting of multi-county areas. The effect of changes in farm production on the regional economies in these basins will be evaluated, including reduced spending on agricultural inputs such as seed, fertilizer, and fuel and transportation.

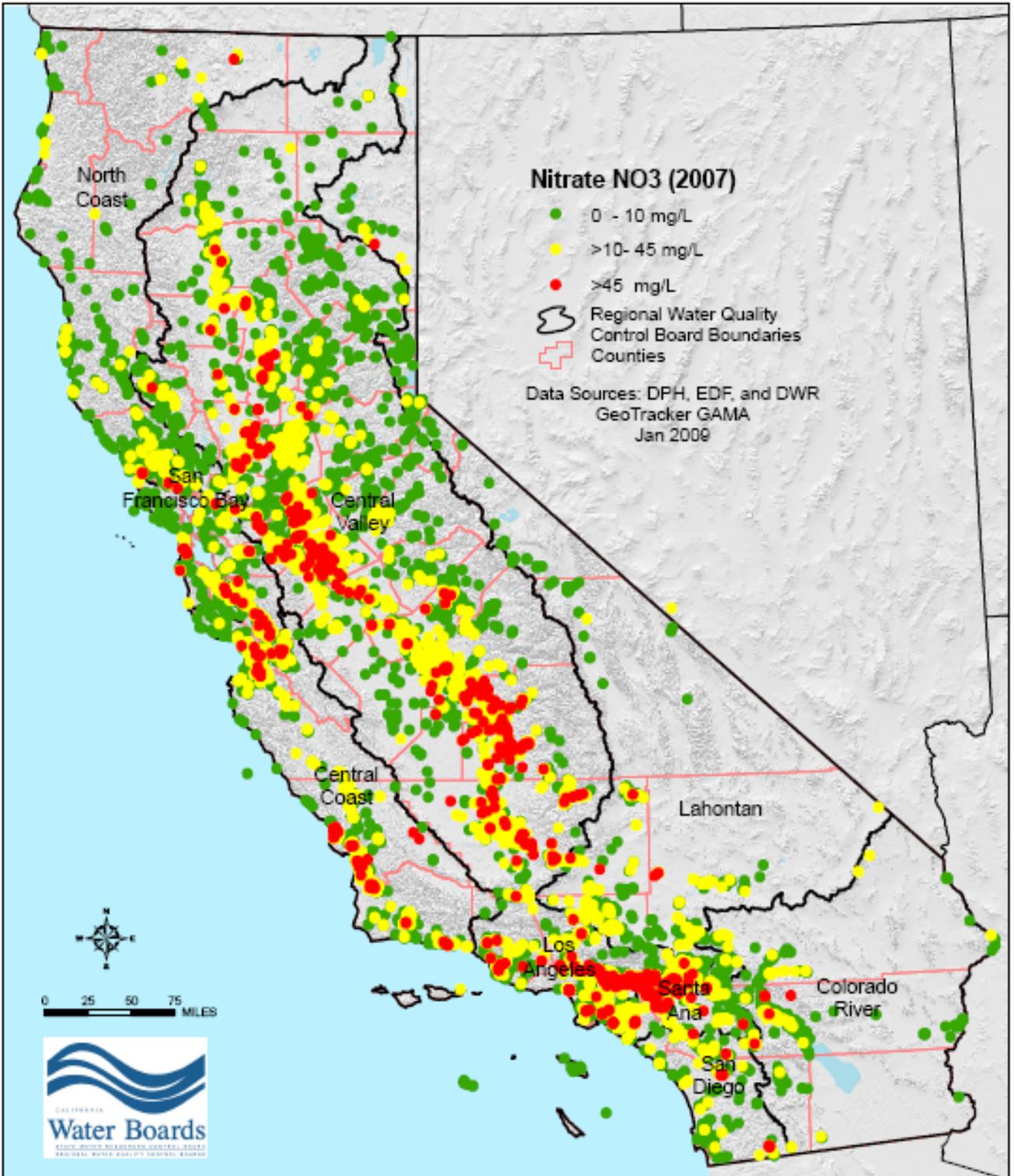
It is anticipated that IMPLAN model runs would be conducted using inputs on changes in farm production and purchases to quantitatively assess the effect of regulatory compliance on affected regional farming economies.

### **Fiscal Analysis**

Fiscal analysis includes consideration of effects of the proposed regulations on the costs and public revenues of local, regional and state government. Fiscal analysis focuses on identifying the effect of additional administrative costs on affected governmental entities, along with potential changes in revenue generation. The net fiscal effect on different funds (general funds, special funds) and entities (local governments, special districts) is assessed. Potential effects on the provision of local government services indirectly resulting from changes in the farming economy also should be considered.

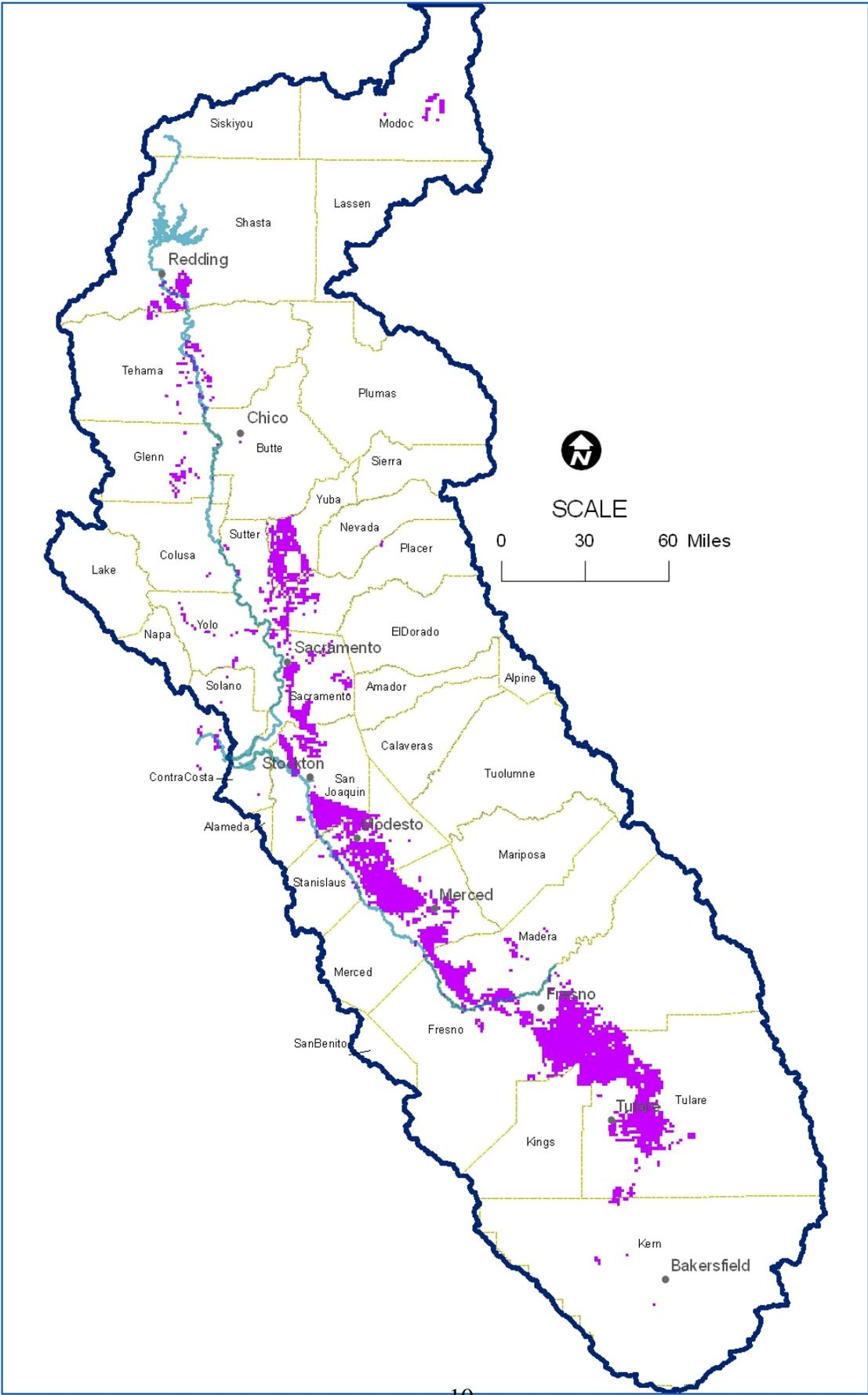
For the ILRP analysis, the public services costs associated with administering the ILRP alternatives would be the focus. Categories of these administrative costs are identified in Table 1. Potential effects of program implementation on local or regional government agencies and on federal funding of local and state programs would be described.

Attachment – State Water Board GeoTracker GAMA  
Nitrate Well Data Sets (2007 dataset)

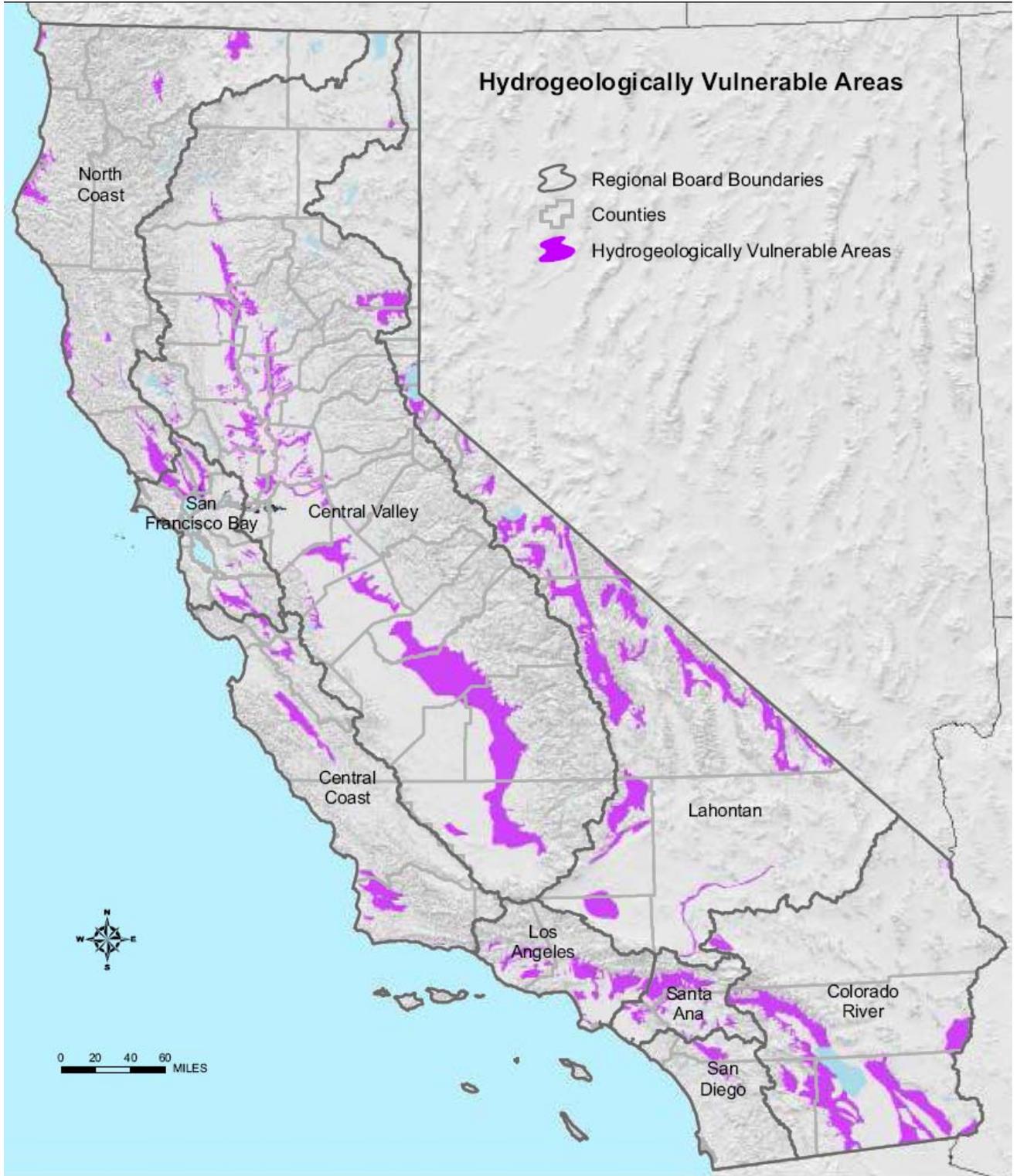


Erik J. Ekdahl, Maria de la Paz Carpio-Obeso, and John Borkovich, Using GeoTracker GAMA to Investigate Nitrate Concentrations in California Groundwater, 1980-2008. California State Water Resources Control Board, 2009; in: Harter, T., 2009. Agricultural impacts on groundwater nitrate, Southwest Hydrology, July/August 2009, p.23-25.

Attachment – Department of Pesticide Regulation  
Central Valley Groundwater Protection Areas



Attachment – State Water Board Hydrogeologically Vulnerable Areas



Vulnerable areas were developed by the State Water Board using geology and land-use patterns.