Framework for the Basin-Wide Socio-Economic Analysis of Four Proposed Sediment Diversions

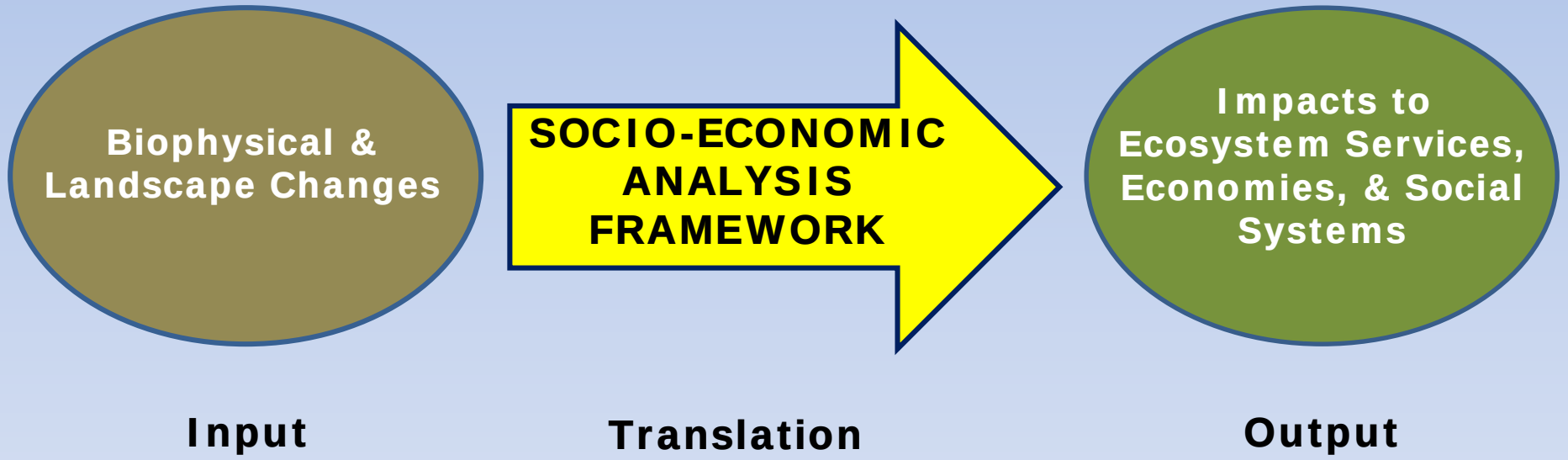
August 4, 2015

Proposed Sediment Diversions

Overview of Presentation

- Literature Review
- Scenarios Being Analyzed
- Major Tools Being Utilized
- Biophysical & Socio-Economic Analysis Boundaries
- Socio-Economic Analysis Methodology
- Six Impact Categories
    - Economic Impact Analysis
    - Ecosystem Service Valuations
    - Social Interpretations
- Output of Analysis
- Feedback on Draft Framework from Panel
- Completion Timeline

Framing of Socio-Economic Analysis Methods



Six Scenarios Will Be Analyzed

Scenario 1: Future without diversion action — FWOA

Scenario 2: Future with only Lower Breton Diversion — FWA

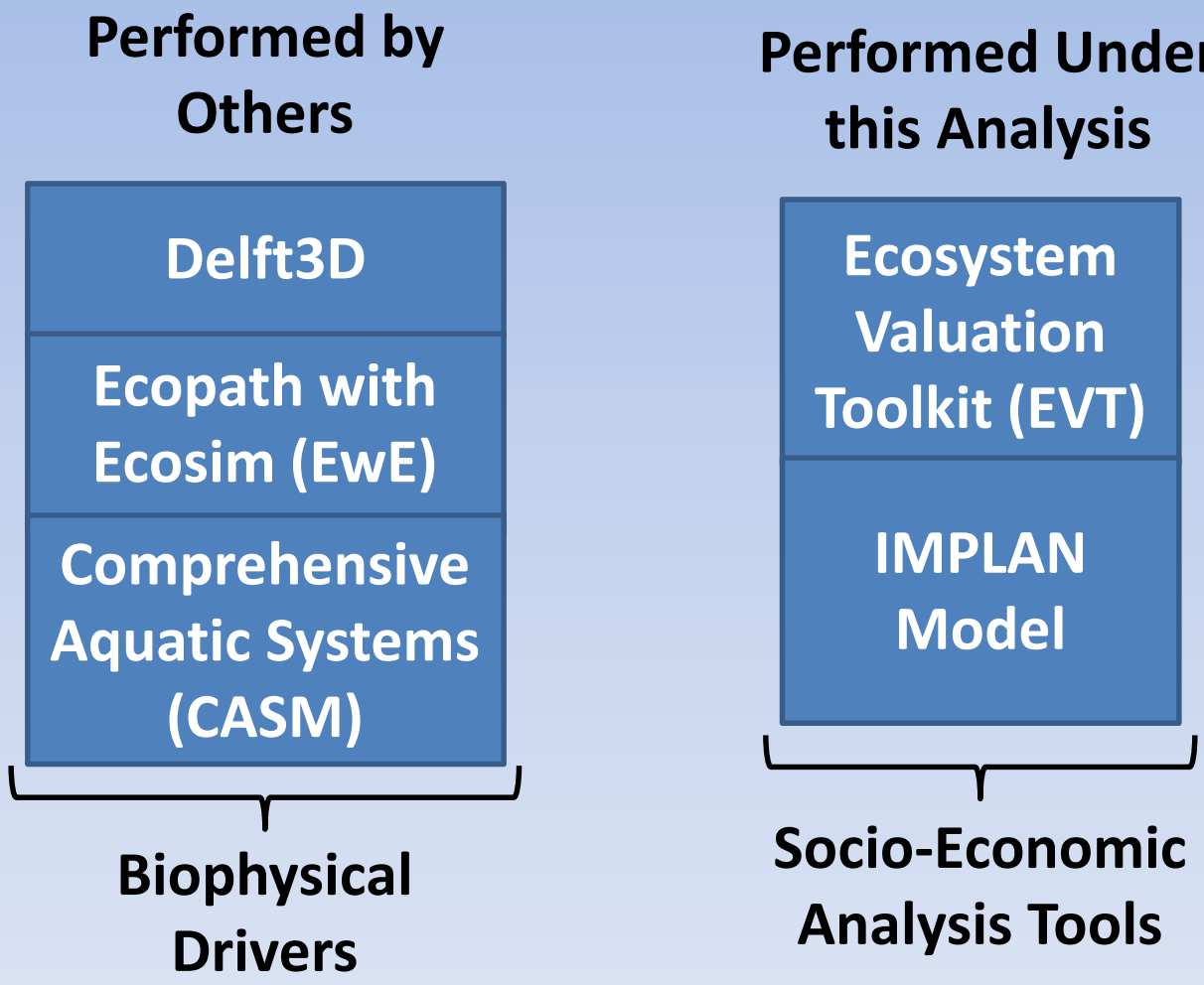
Scenario 3: Future with only Lower Barataria Diversion — FWA

Scenario 4: Future with only Mid Breton Diversion — FWA

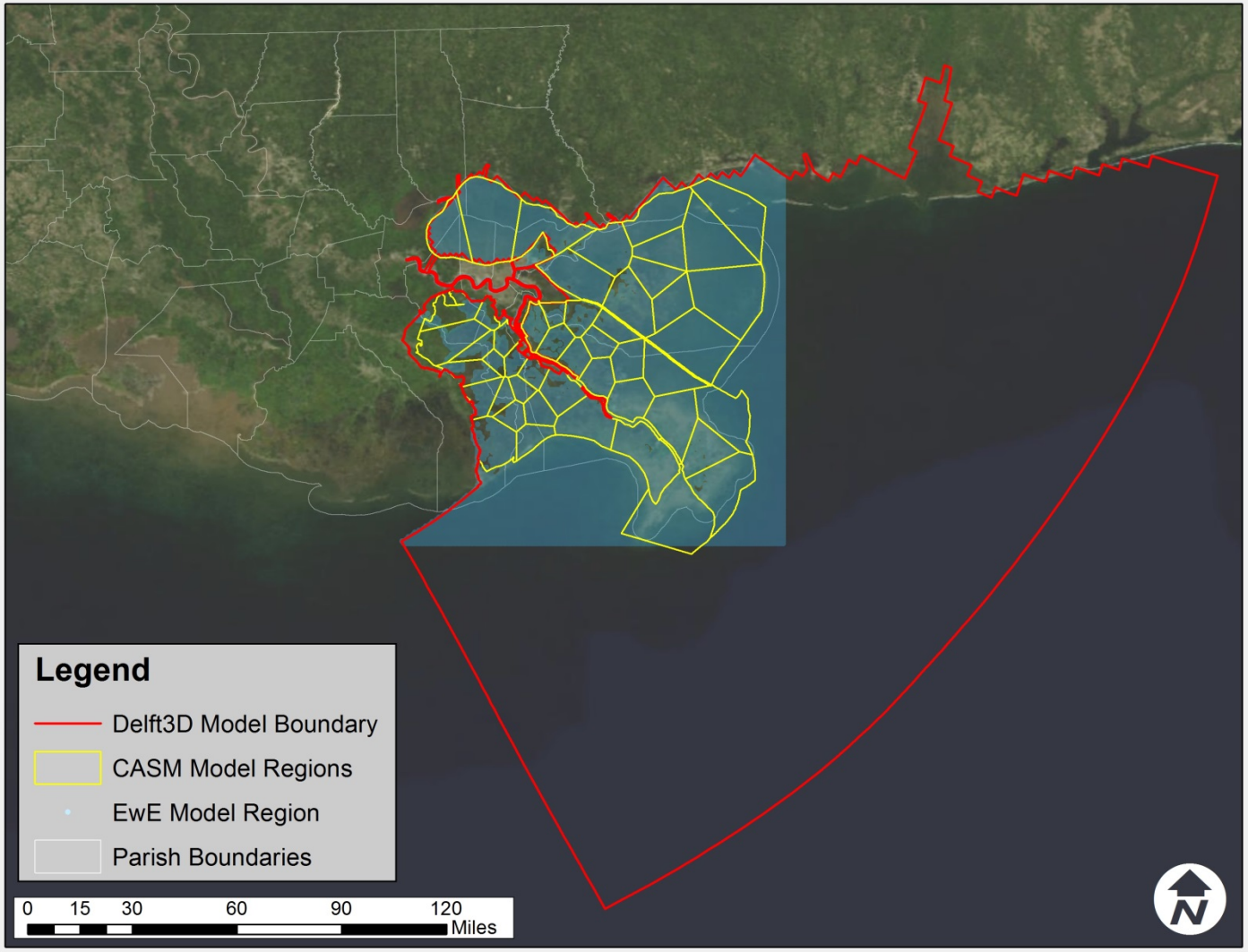
Scenario 5: Future with only Mid Barataria Diversion — FWA

Scenario 6: Future with all 4 diversions operating simultaneously — FWA

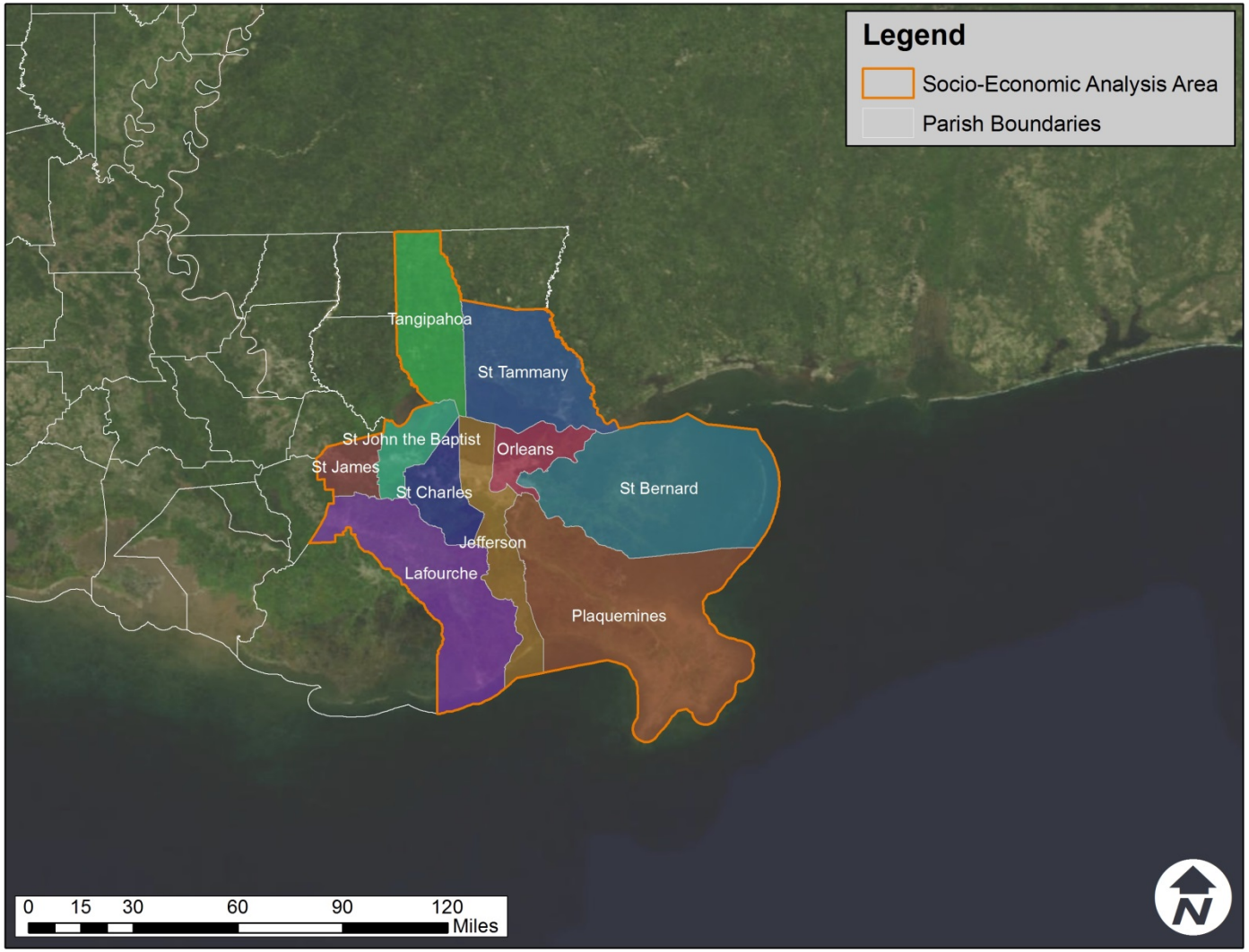
Major Tools Informing This Analysis



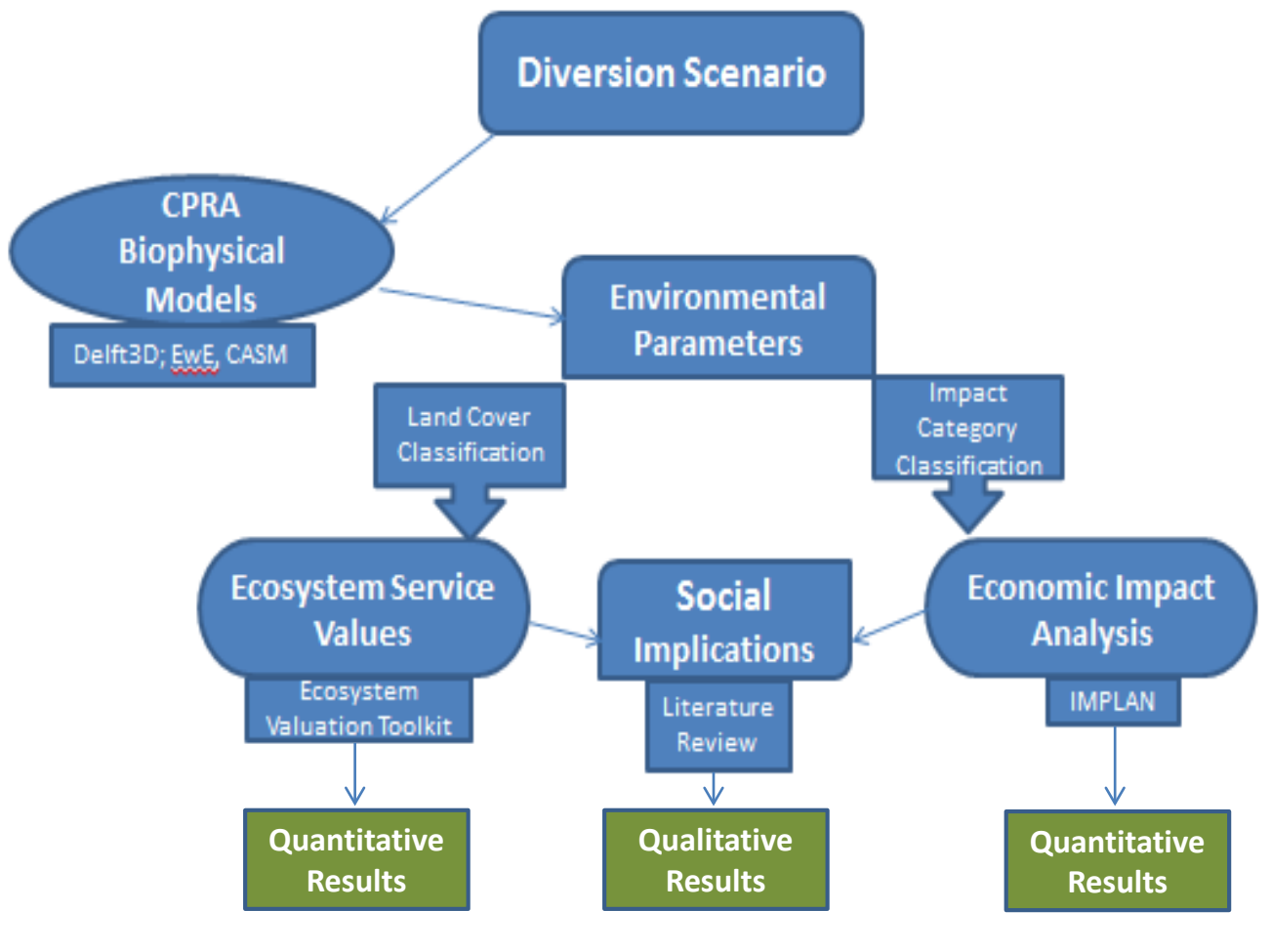
Biophysical Analysis Area



Socio-Economic Analysis Area



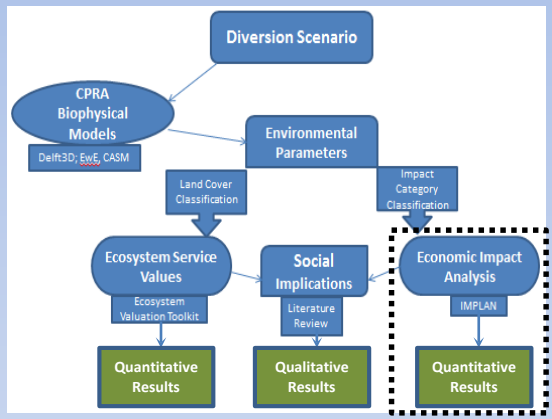
Overview of Methodology



Impact Categories: (1) Commercial Fisheries, (2) Water Supply, (3) Navigation, (4) Recreation, (5) Storm Protection, (6) Ecosystem Services

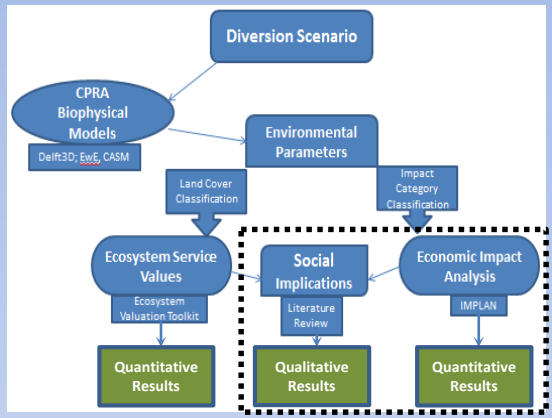
Economic Results

- IMPLAN Input by Economic Sector
- Inputs by Sector:
  - Changes in Costs, Expenditures, and Sales for six impact categories.
- Resulting Impacts by Sector and Parish:
  - Sales, Job Creation, Tax Revenue, Income Generation



Socio-Economic Analysis Impact Categories

1. Commercial Fisheries



Biophysical Data

- Fisheries harvest by location

Spatial Allocation

- Landings by Parish

Economic Analysis

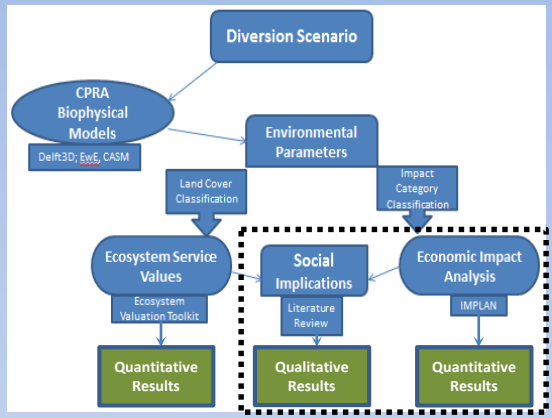
- Revenue flows and jobs

Social Interpretation

- Cultural importance

Socio-Economic Analysis Impact Categories

2. Water Supply



Biophysical Data

- Salinity, water level, total suspended solids, nitrate

Spatial Allocation

- Municipal and private water supplies

Economic Analysis

- Business resilience, influenced productivity change, and increased utility costs

Social Interpretation

- Cost of living changes

Socio-Economic Analysis Impact Categories

3. Navigation

Biophysical Data

- Relative change in dredging volume

Spatial Allocation

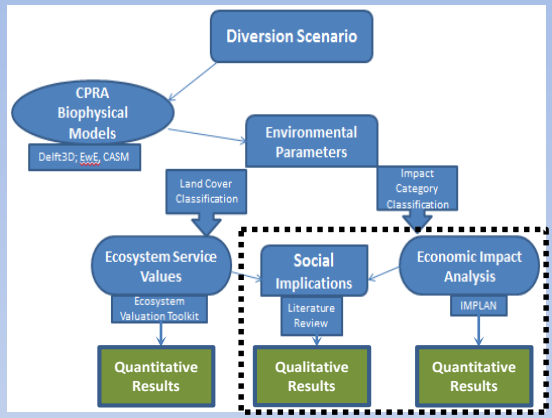
- Dredging activity

Economic Analysis

- Dredging costs

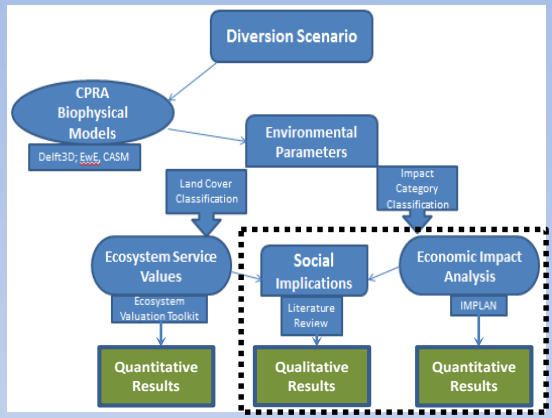
Social Interpretation

- Employment, beneficial use of dredged material



Socio-Economic Analysis Impact Categories

4. Recreation



Biophysical Data

- Land cover, recreational fishing catch

Spatial Allocation

- EwE sub-basins

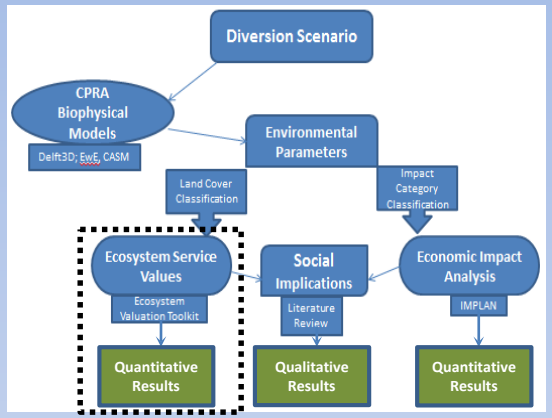
Economic Analysis

- Revenue flows and jobs

Social Interpretation

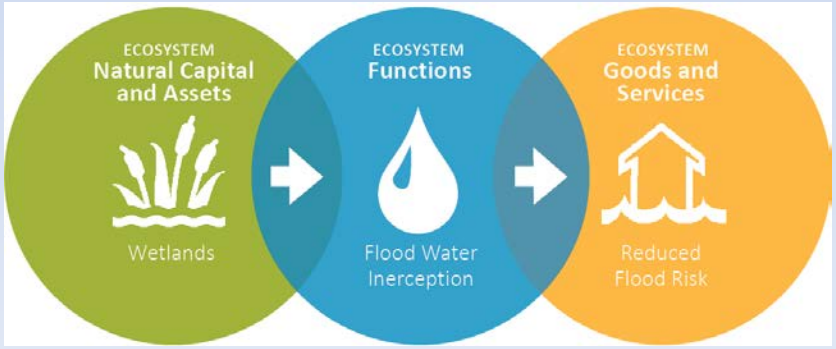
- Cultural importance, quality of life

Ecosystem Service Valuation (ESV)



ESV Results:

- Monetary values for 21 ecosystem service categories
  - Based on published primary studies
  - Benefits beyond market revenue flows
  - Indicative of the land cover type value (non-market)



Ecosystem Service Classification

1. **Provisioning Services**
   - Provide ecosystem goods that can be physically quantified and monetarily valued
2. **Regulating Services**
   - Provide benefits through the natural control of ecosystem processes
3. **Supporting Services**
   - Provide refuge and reproductive habitat to wild plants and animals
4. **Information Services**
   - Provide humans with meaningful interaction with nature

21 Standard Ecosystem Service Categories

Provisioning Services

1. Food
2. Medicinal Resources
3. Ornamental Resources
4. Energy and Raw Materials
5. Water Supply

Regulating Services

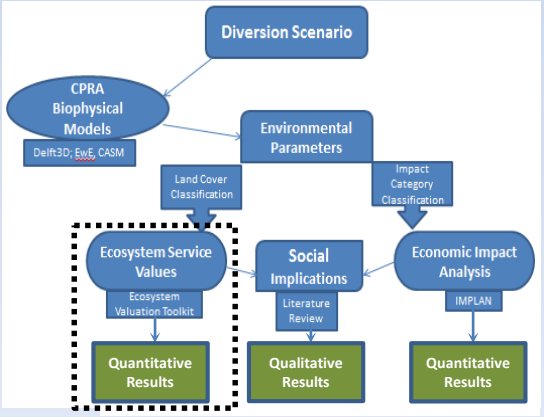
6. Biological Control
7. Climate Stability
8. Air Quality
9. Moderation of Extreme Events
10. Pollination
11. Soil Formation
12. Soil Retention
13. Waste Treatment
14. Water Regulation

Supporting Services

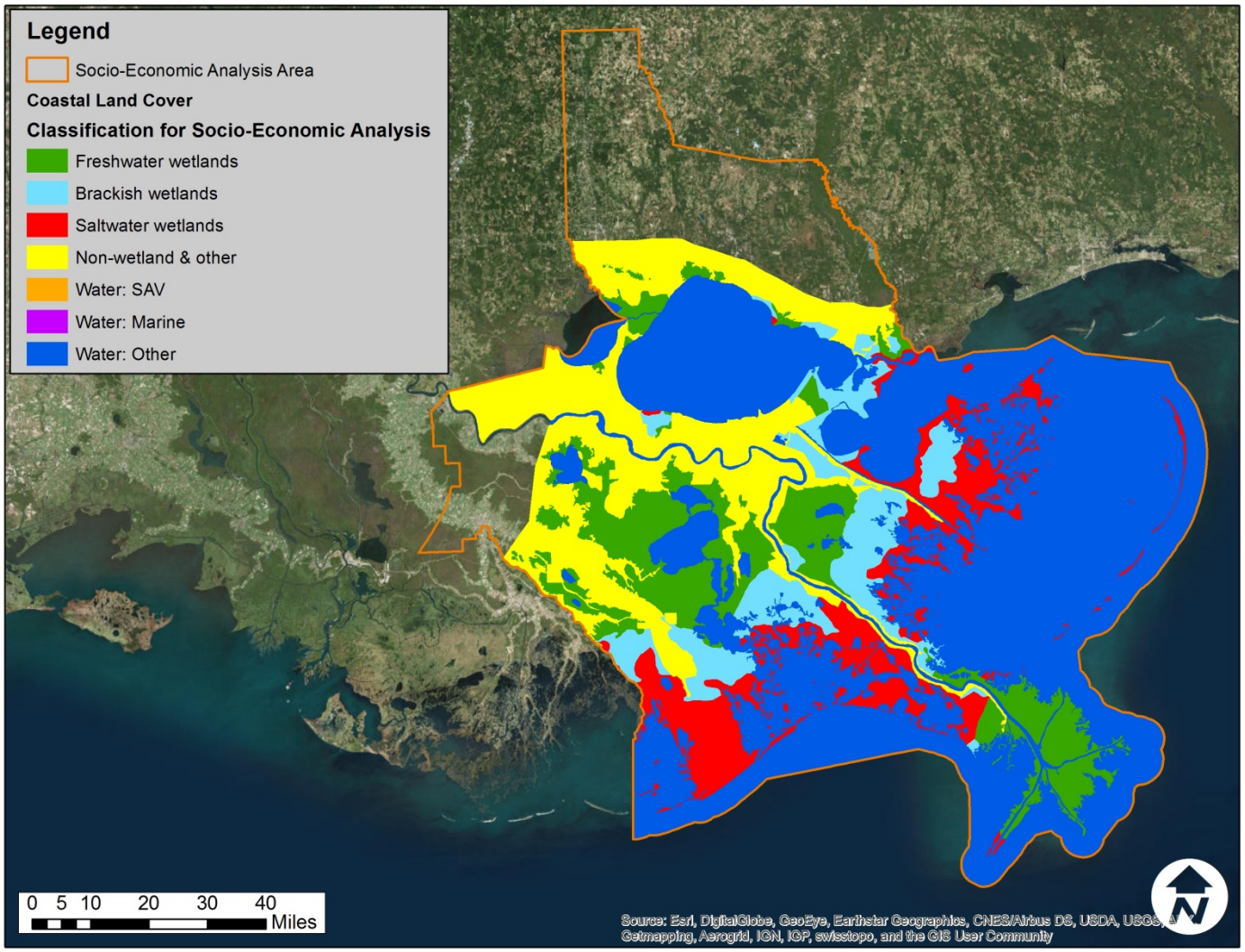
15. Habitat and Nursery
16. Genetic Resources

Information Services

17. Natural Beauty
18. Cultural and Artistic Inspiration
19. Recreation and Tourism
20. Science and Education
21. Spiritual and Historical

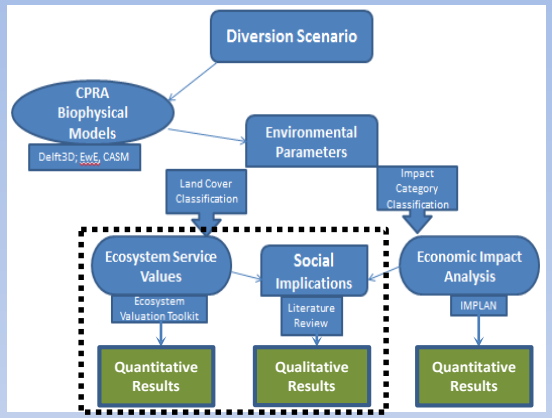


ESV Land Cover Classification



Socio-Economic Analysis Impact Categories

5. Ecosystem Services



Biophysical Data

- Vegetation cover, salinity

Spatial Allocation

- Land cover type and acreage per parish

Economic Analysis

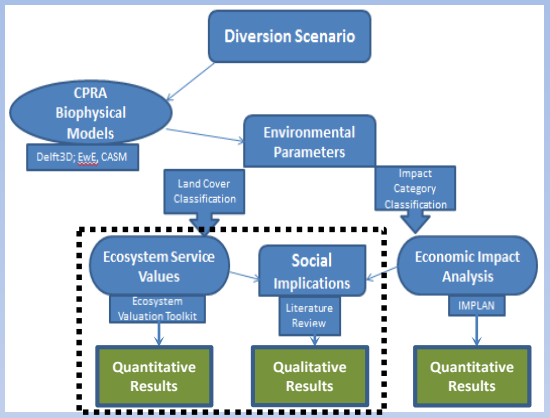
- Benefit transfer value per acre and total

Social Interpretation

- Key informational services gained or lost. Natural beauty, cultural importance.

Socio-Economic Analysis Impact Categories

6. Storm Protection



Biophysical Data

- Wetland morphology

Spatial Allocation

- Wetland formation per parish

Economic Analysis

- Benefit transfer value per acre of wetland

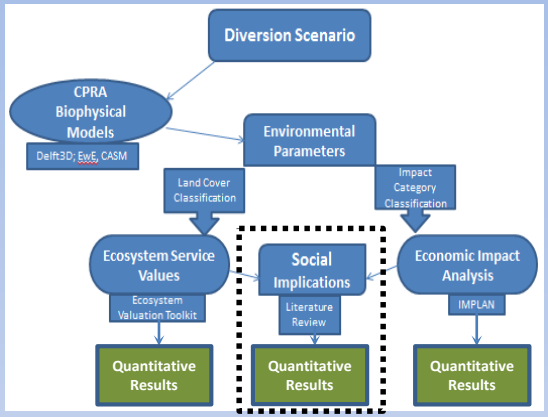
Social Interpretation

- Increased sense of security for residents and businesses.

Social Results

Social Results:

- From existing social science literature, local surveys, and local development plans
- Descriptive results and interpretations of quantitative results
- Informative measure for CPRA to consider for outreach & planning



Output of Analysis

Scenario	Economic Results				Ecosystem Service Results	Social Results
	Sales	Job Creation	Tax-Base Contribution	Income Generated		
1 – 6	+$ / -$?	+# / -# ?	+$ / -$?	+$ / -$?	+$ / -$?	+ / - ?

Feedback on Draft Framework

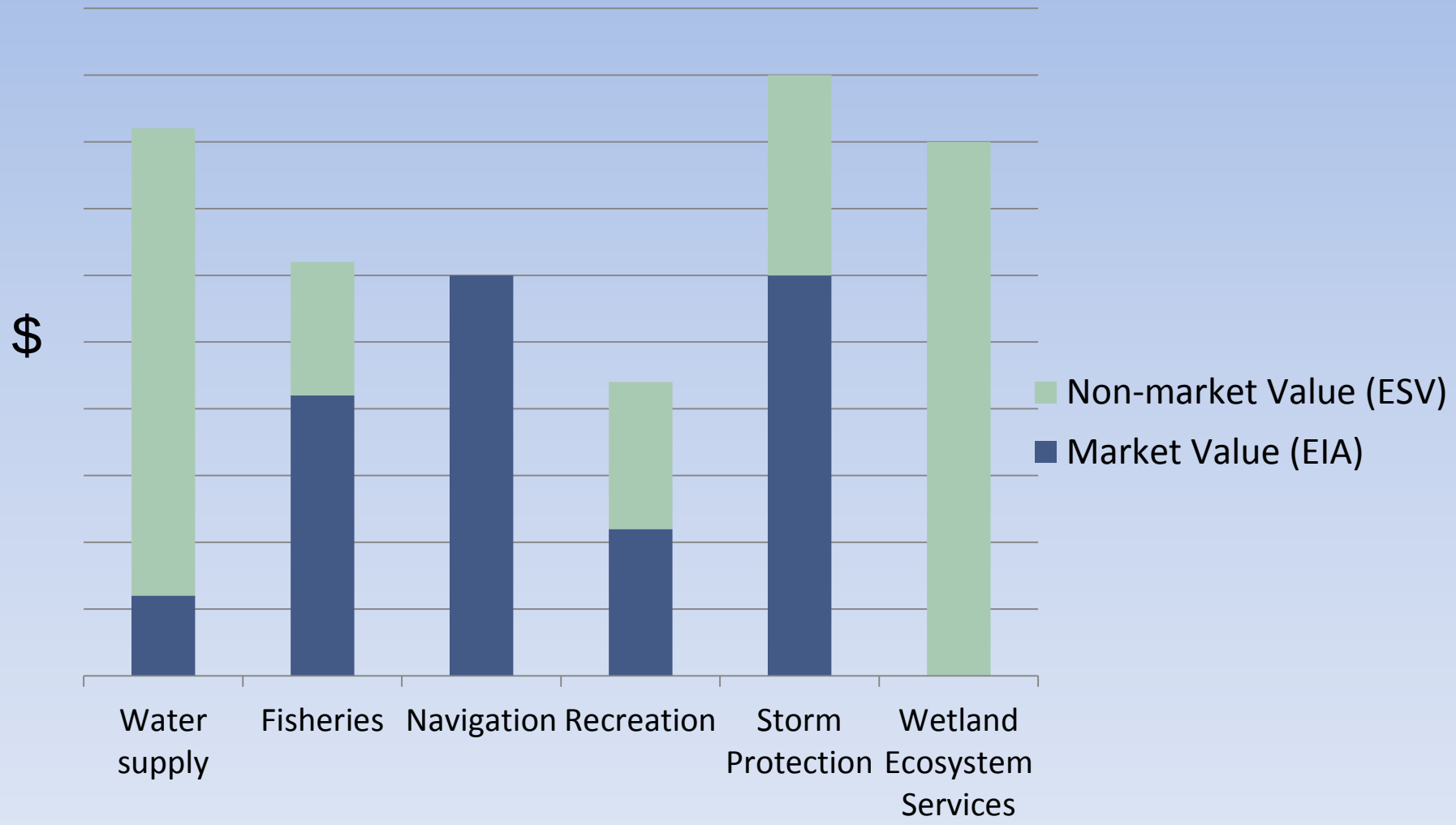
- Primary Social Indicators
- Overlap Between Economic Impact Analysis and Ecosystem Service Valuation
- Error Estimation
- Validation of Framework with Implemented Diversions

Primary Social Indicators

Social Indicators*	Impact Categories					
	Commercial Fisheries	Water Supply	Navigation	Recreation	Storm Protection	Ecosystem Services
Employment	X		X	X	X	
Finance	X	X	X	X	X	
Institutional and Legal Protection		X			X	
Public Services		X		X	X	
Human Health	X	X		X	X	
Community	X		X	X	X	
Access to Natural Resources	X	X		X	X	X

***List expands to approximately 45 indicators, which will be informed by EVT, IMPLAN, and socio-economic literature**

Economic Impact Analysis and Ecosystem Service Valuation



Error Estimation

Biophysical Drivers:

- Three statistical performance metrics for Delft3D, EwE, and CASM parameters
  - Percent root mean square error (RMSE)
  - Correlation coefficient
  - PBIAS (Addresses over-/under-prediction)

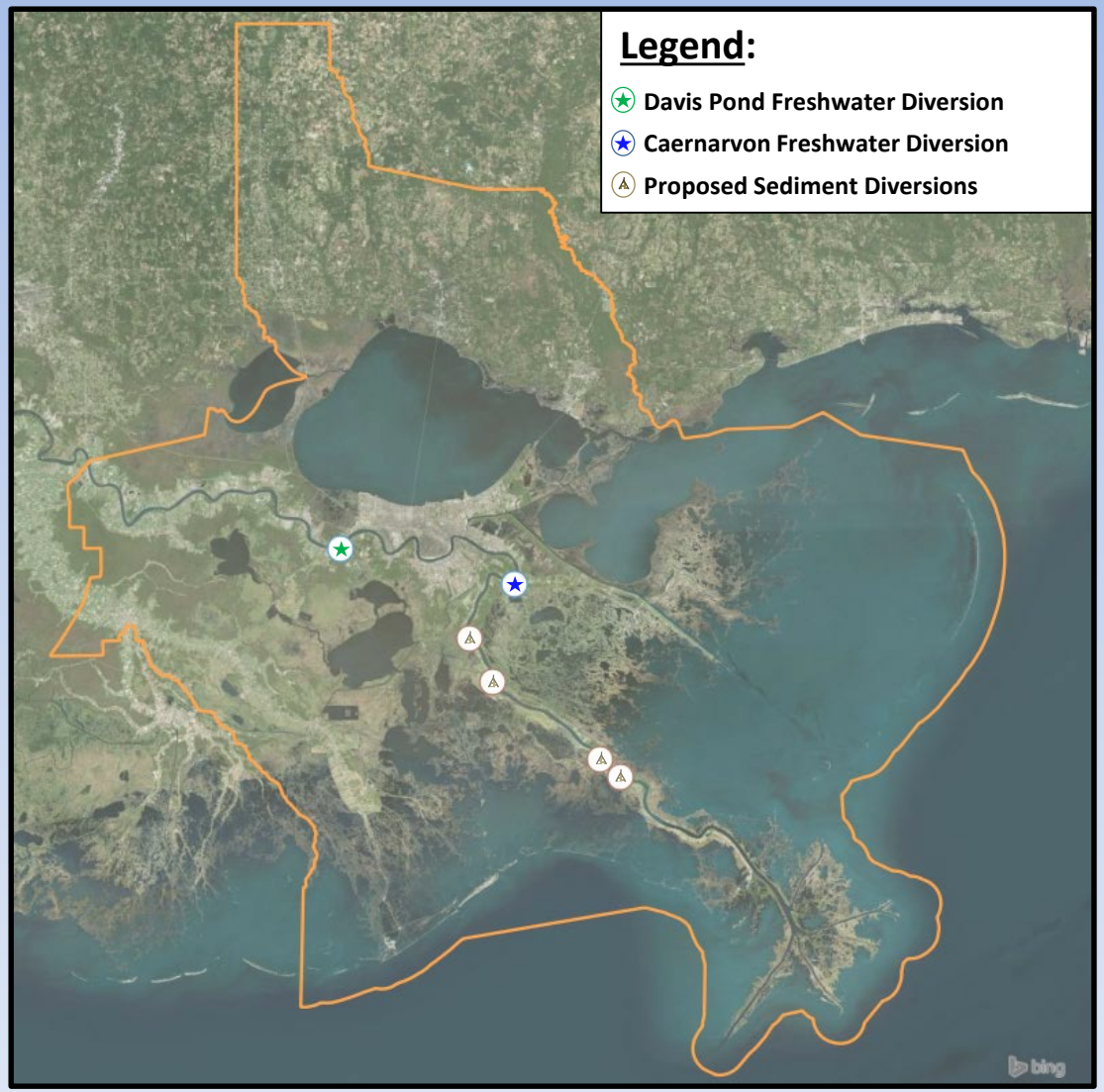
Socio-Economic Analysis Tools:

- Sensitivity analysis with respect to RMSE of critical biophysical parameters
- Validation with respect to implemented diversions for identification of potential errors

Validation of Framework with Implemented Diversions

Davis Pond Freshwater Diversion (Source: USACE)

Caernarvon Freshwater Diversion (Source: USACE)



Location Map

Considerations for Evaluating Results

Groupings of Results:

- Evaluate each alternative independently.
- Evaluate each scenario against FWOA.

Questions We'll Be Asking:

- What major trends are evident over the 50-year analysis period?
- What values or magnitudes are significant thresholds for evaluating results?
- What important nuances can we discern in sub-categories of 3 major output types?

End Goal:

- Provide valuable socio-economic results to inform CPRA's decision(s) about diversions

Completion Timeline

December 2014: Project Kickoff

January 2015: Literature Review Complete

January - July 2015: Framing of Socio-Economic Analysis Methods

August - December 2015: Perform Socio-Economic Analysis of Six Diversion Scenarios

Mid-October 2015: Preliminary Results

Mid-December 2015: Final Report Due