

Sustainable Water Quality and Supply - New Approaches for the New Normal

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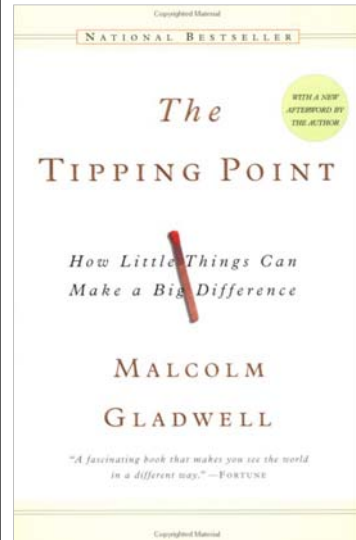
Overview of Topics

- What sustainability is and how it applies in the water context
- Three Case Studies
 - Water reclamation - sustainability of proposed nutrient reductions
 - Water supply – understanding energy usage and means to conserve
 - Ecosystem – achieving sustainable ecosystems

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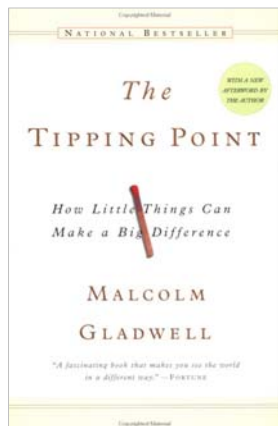
Tipping Point... Convergence of Climate Change, C footprint, "Peak Oil", Economy



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Tipping to... the New Normal



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The New Normal

The New Normal... won't be the same

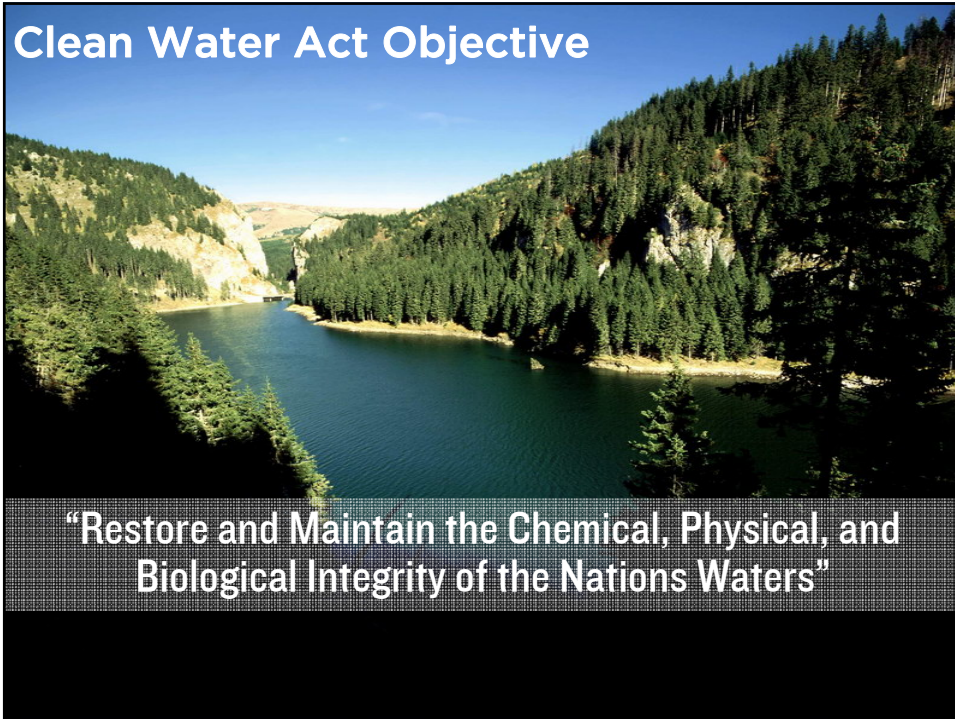


Sustainable, Triple Bottom Line Decision-making



TRIPLE BOTTOM LINE

Clean Water Act Objective



“Restore and Maintain the Chemical, Physical, and Biological Integrity of the Nations Waters”

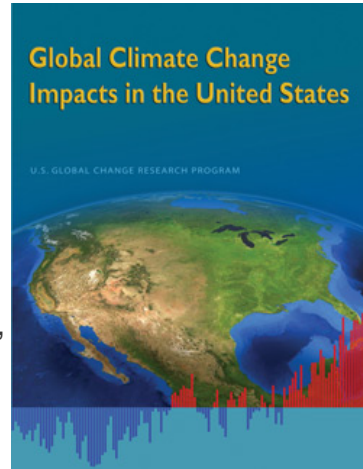
Clean Air Act Objective



“Protect human health, welfare, and the environment by maintaining and improving the quality of the air through the development of standards”

Climate Change – An Undeniable Condition of our New Normal

- Change is “unequivocal” and largely human-induced
- Will stress water resources in many new ways
- Crossing certain thresholds could further accelerate effects
- Top priority for EPA
- Concepts of 1) mitigation measures to slow climate change, 2) adaptation measures
- "avoiding the unmanageable and managing the unavoidable"



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Need to Move from Regulatory Silos to Holistic Environmental Solutions – Air, Water, Land



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Current Federal Priorities Reflect a More Comprehensive Perspective



- Climate change (achieving 20% renewable energy by 2025)
- Promoting and protecting “treasured landscapes”
- Managing water by resolving conflicts that have stifled progress



U.S. Department of the Interior

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EPA HQ Sustainability Research Strategy (June 8, 2007)

“new environmental protection paradigm, which moves beyond the original emphasis on regulating pollution to achieving the **more complex goal of sustainable policies that impact ecosystems, land development, and other broad areas including energy and transportation**”

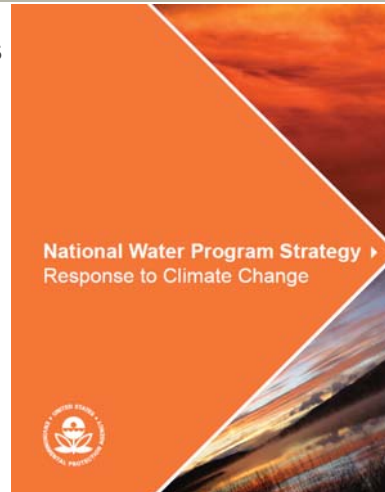


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EPA Response to Climate Change (September 2008)

- Mitigation of greenhouse gases
- Adapting water programs
- Research
- Education
- Water program management



<http://www.epa.gov/water/climatechange/strategy.html>

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Efforts to Mitigate GHG

- Energy conservation – achieve water-related energy conservation and production
- Water conservation – reduce energy use through water conservation
- “Green building” design and “smart growth” – to reduce energy and water needs



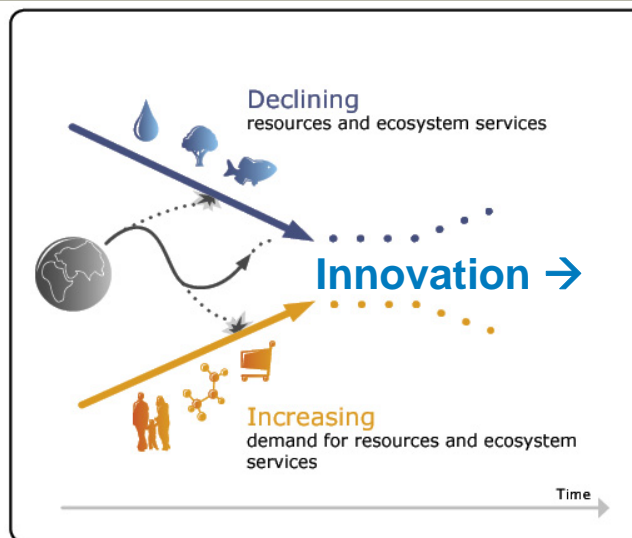
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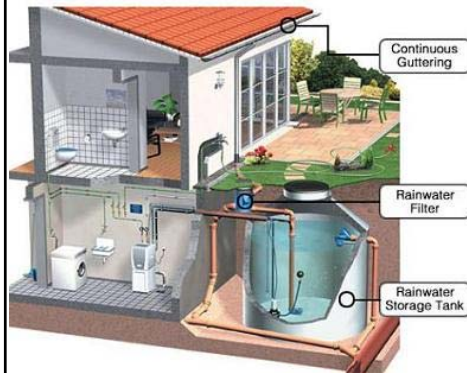
Adaptations to Climate Change

- Drinking water, water quality, and effluent standards
- Watershed approaches
- NPDES permits – maintain protection of water quality
- Sustainable water infrastructure initiative
- Wetlands mitigation

The New Normal is Driving Innovation



Stormwater as a Resource



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Wastewater as an Asset



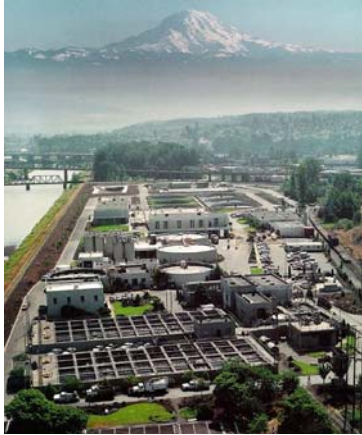
- Energy
- Nutrients
- Reclaimed water



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Planning for Sustainability



- Identify sustainability as a level of service
- Set pricing standards to monetize sustainability parameters
 - \$/ ton of CO₂ emissions
 - \$/ kg of persistent and non-persistent pollutants to water or air
- Prioritize projects in CIP based on ability to meet sustainability goals
- Perform Business Case Evaluation (BCE)
 - incorporates social, financial, and environmental issues into decision-making


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Case Studies – Sustainable Efforts in the Water and Wastewater Industry




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Sustainability of Proposed Boise City Nutrient Reductions

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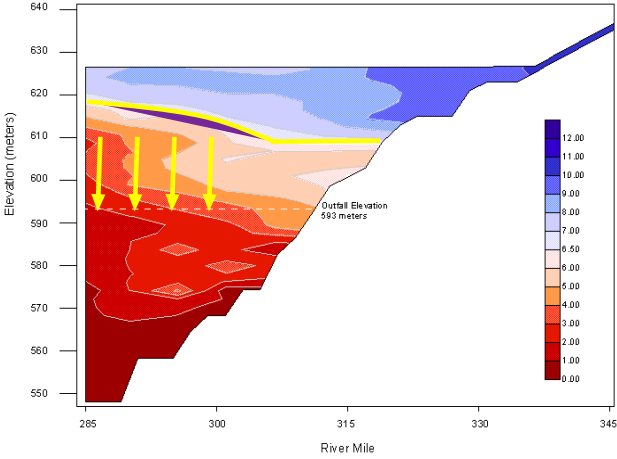
The Issue



ANADROMOUS STURGEON
The sturgeon is a prehistoric fish, with a long history of being hunted for its roe. It is a large, elongated fish with a bony, scaly skin. The Pacific Sturgeon is the largest species, growing to over 6 meters in length. It is found in the Pacific Northwest and the Columbia River. The fish is highly valued for its roe, which is used in caviar. However, the fish is now endangered due to overfishing and habitat loss. Conservation efforts are underway to protect the species.

Brownlee Reservoir Dissolved Oxygen

Average May - October, 1999



Outlet Elevation 593 meters

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TMDL Targets

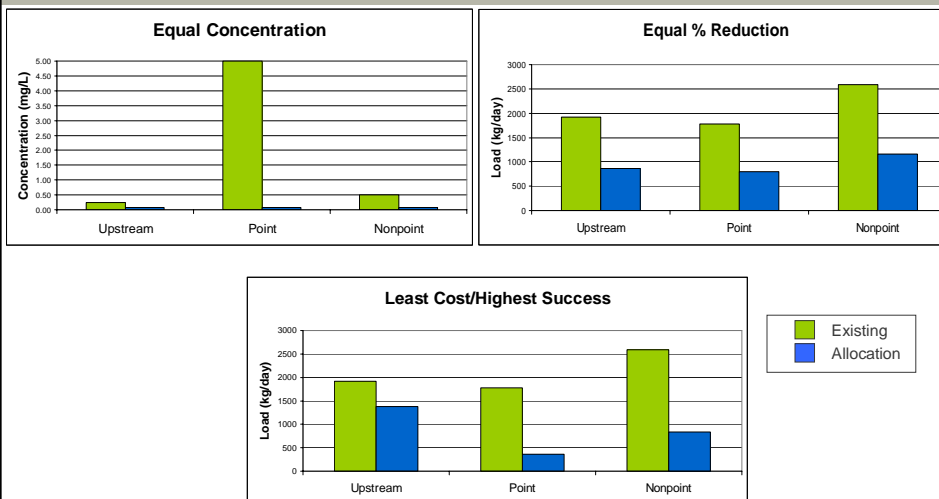


- 0.07 mg/L Total P in Snake River and at mouth of each tributary
- Average flows
- Seasonal duration (May to September)
- Translates to 3091 kg/day from Boise City

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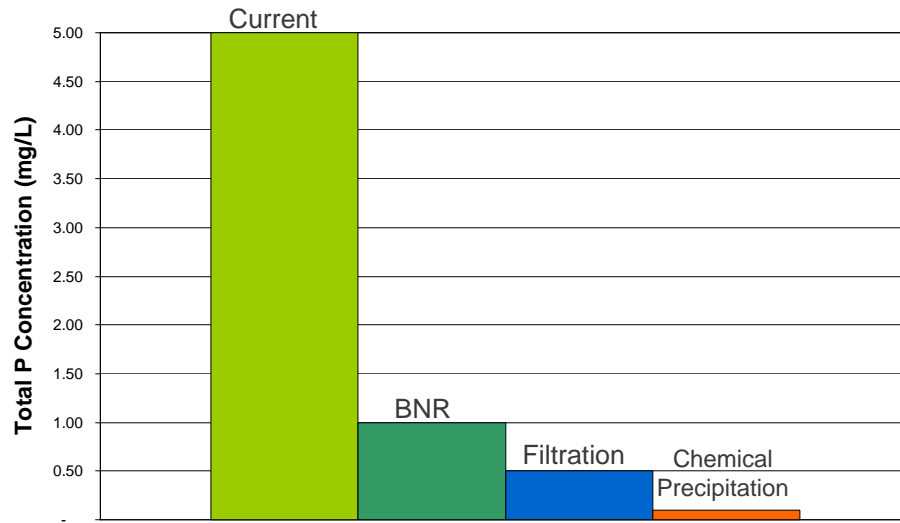
Allocation Options (Starting with 6000 kg/day)



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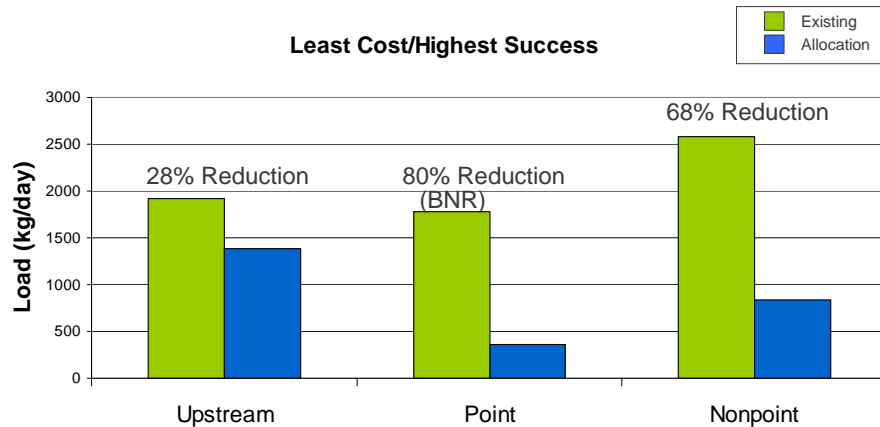
Point Source Reductions



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Least Cost Basin-Wide Allocation (Boise Agreed to P Limits of ~60 kg/day, Down From 1260 kg/day)



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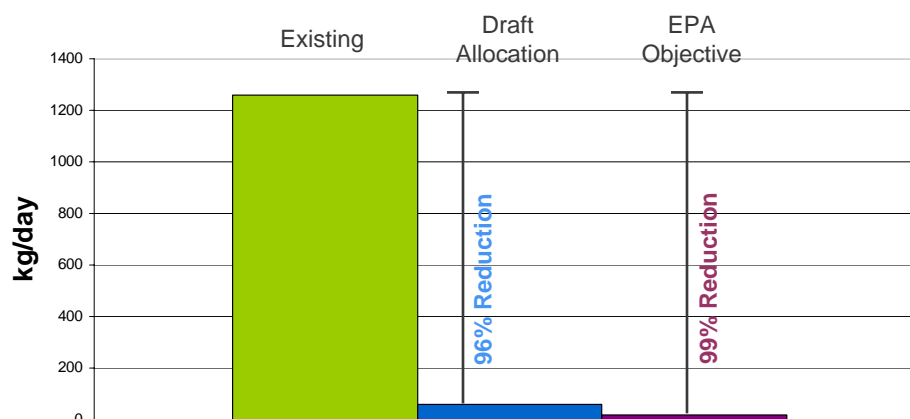
DO Load Allocation for Brownlee Reservoir (1,125 tons oxygen/summer season)



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EPA Rejected TMDL and Proposed Lower Boise Limits (worth another 37 kg/day vs 3091 kg/day target)



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Sustainability Considerations for City of Boise

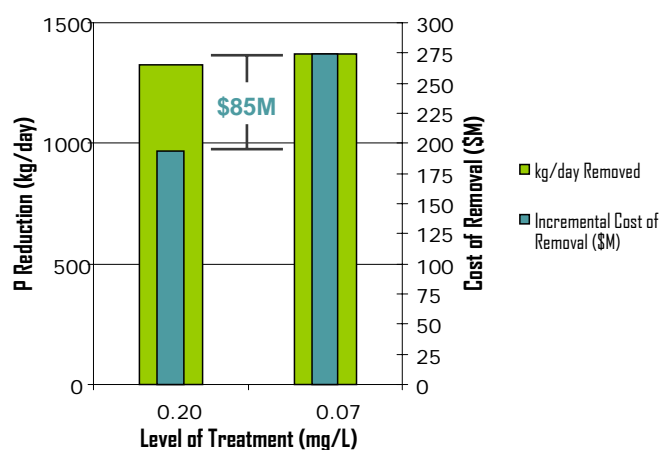
- Recently signed U.S. Mayors Climate Protection Agreement
 - Meeting Kyoto protocols target for reduction of GHG
 - 7% reduction from 1990 levels by 2012
 - Wastewater treatment a significant component of City energy use
- Aim to consider overall net environmental benefit



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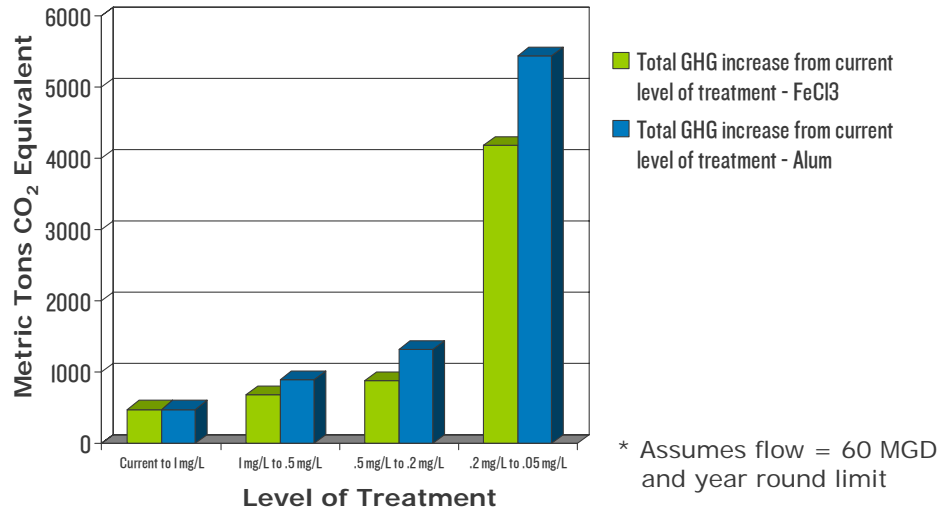
Financial Cost \$85M to Remove 37 kg/day



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Environmental Cost 5000 m tons/year CO₂ for 13.5 m tons of P



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Social and Other Costs

- Increased mining/transport of chemicals
 - Bauxite mining for alum
 - “Red mud” residual, air pollution, water pollution
 - Damage in developing nations (Jamaica or Guinea)
- Greater sludge production
- Reduced ability to beneficially reuse WWTP sludge
- Increased land application



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Boise Pursuit of Sustainability Continues...

- Ongoing dialogue – City of Boise, EPA, IDEQ
- Potential solution
 - Total P of 0.1 to 0.4 mg/L
 - Optimized EBNR, no membranes, no chemical addition
 - [Resource recovery]
 - [Full nitrification/de-nitrification]
 - Trade for remaining to reach 0.07 mg/L target
- Sustainability improving with technology

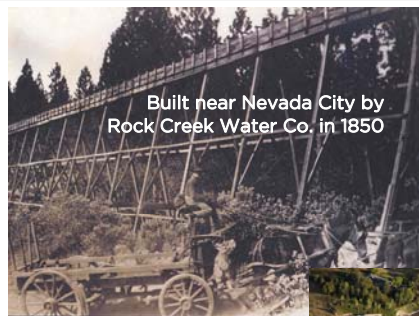
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A New Water
Energy Nexus

Placer County
Water Agency

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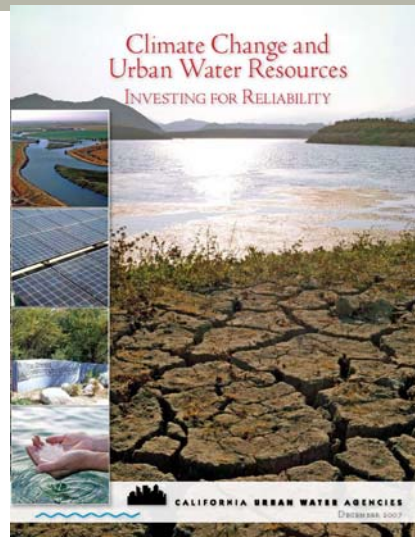


Project Objectives

- Benchmark energy use
 - current use
 - where, type, costs
 - future use
 - where, type, costs
- Identify energy conservation options
- Evaluate alternative energy opportunities
- Inventory greenhouse gas (GHG) emissions

Momentum Gaining for Water Energy Conservation

- CA Assembly Bill 32 (2006) - GHG emissions return to 1990 levels by 2020
- California Urban Water Agencies (2007) — Adaptation Strategies
- California State Association of Counties Climate Change Policy Statements and Principals (2007)
- Concept of “C-free Water”



Guidance Available

- Environmental Protection Agency—Sustainable Energy Management Guidebook, 2008
 - Provides guidance on developing and implementing energy conservation and diversification strategies.

Ensuring a Sustainable Future: An Energy Management Guidebook for Wastewater and Water Utilities



JANUARY 2008

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Renewable Energy also Gaining Momentum

- Currently 24 States have a Renewable Portfolio Standard (RPS)
- California
 - RPS mandates 20% renewable energy by the end of 2010
 - Governor's executive order 33% renewable energy by the end of 2020
 - Currently 12-13% renewable energy use
 - Renewable includes solar, wind, geothermal, and some hydroelectric power

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Energy Benchmarking for PCWA

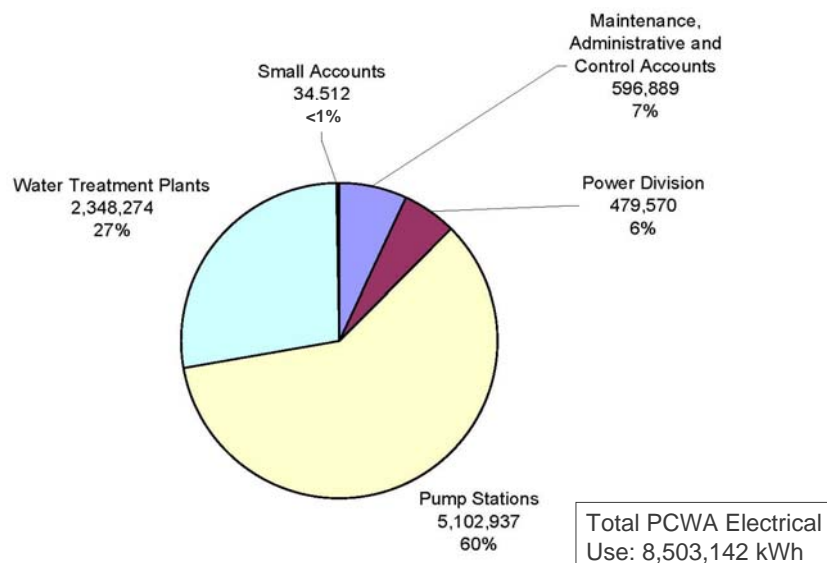
- Consolidated and examined 2006 and 2007 energy usage records
- Reviewed energy usage trends and patterns
- Compared to typical industry metrics
- Underscored the importance of energy conservation and usage reduction
- Established a firm foundation for conservation and usage reduction

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2007 Electrical Use by Category (kWh)

121 electrical accounts/15 rate schedules



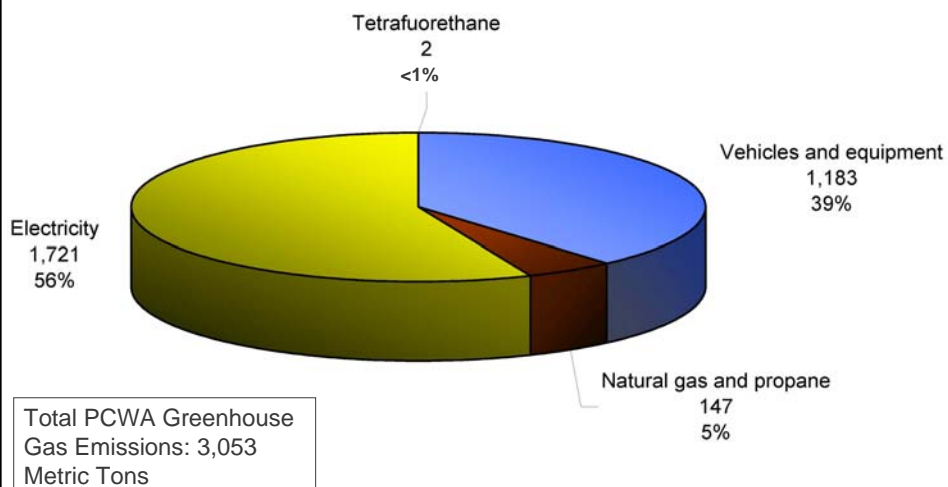
Energy Conservation and Efficiency Potential Cost Savings

- Via just “low hanging fruit: ~5 to 10%
- With process modifications: ~10 to 20%
- With operational modifications: ~10 to 15%
- With all the above: ~15 to 30%

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2007 Greenhouse Gas Inventory (Metric Tons of CO₂ Equivalent)



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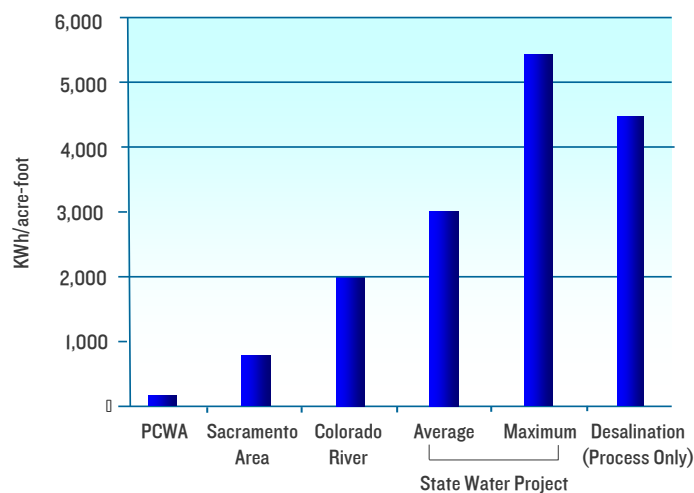
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Registering GHG Reductions – Climate Action Reserve



- CAR is a non-profit voluntary registry for greenhouse gas (GHG) emissions
- CAR is used to establish GHG emissions baseline
- GHG inventory results certified by Registry (and 3rd party contractor)

The Energy Cost of Water – Forcing a look at Conservation and Local Supplies



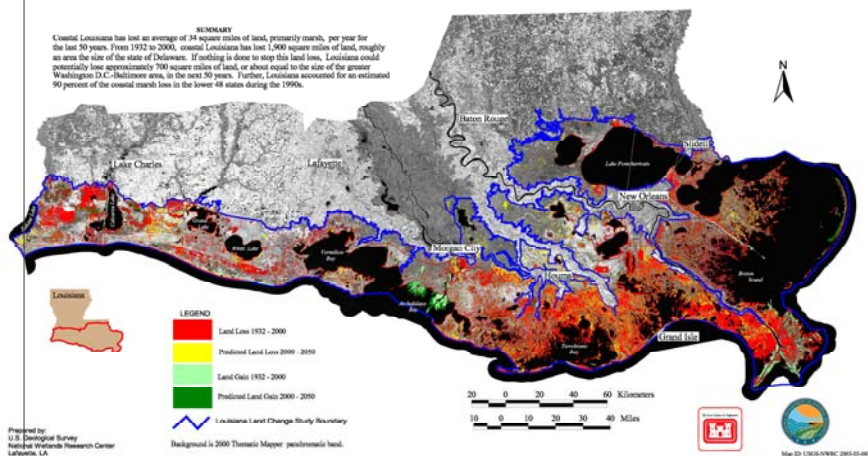
Louisiana
Coastal
Protection
and
Restoration

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USGS
science for a changing world

SUMMARY

Coastal Louisiana has lost an average of 34 square miles of land, primarily marsh, per year for the last 50 years. From 1932 to 2000, coastal Louisiana has lost 1,900 square miles of land, roughly an area the size of the state of Delaware. If nothing is done to stop this land loss, Louisiana could potentially lose approximately 700 square miles of land, or about equal to the size of the greater Washington D.C./Baltimore area, in the next 50 years. Further, Louisiana accounted for an estimated 90 percent of the coastal marsh loss in the lower 48 states during the 1990s.



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Financial – Ongoing Need for a Working Coast



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Social – Hurricanes and Flooding Wreak Havoc

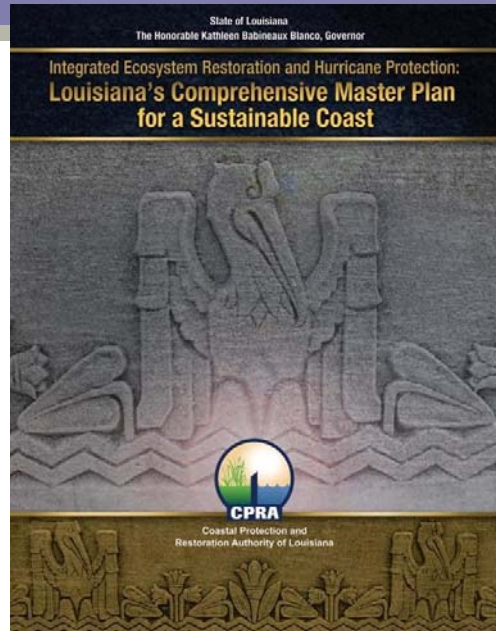


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Louisiana's Sustainable Coast Plan



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Master Plan Objectives – a Triple Bottom Line for Louisiana

- 1. Reduce storm damages from flooding
- 2. Promote a sustainable coastal ecosystem by harnessing natural system processes
- 3. Provide fish and wildlife habitats that support an array of commercial and recreational activities coast wide
- 4. Sustain, to the extent practicable, the unique heritage of coastal Louisiana

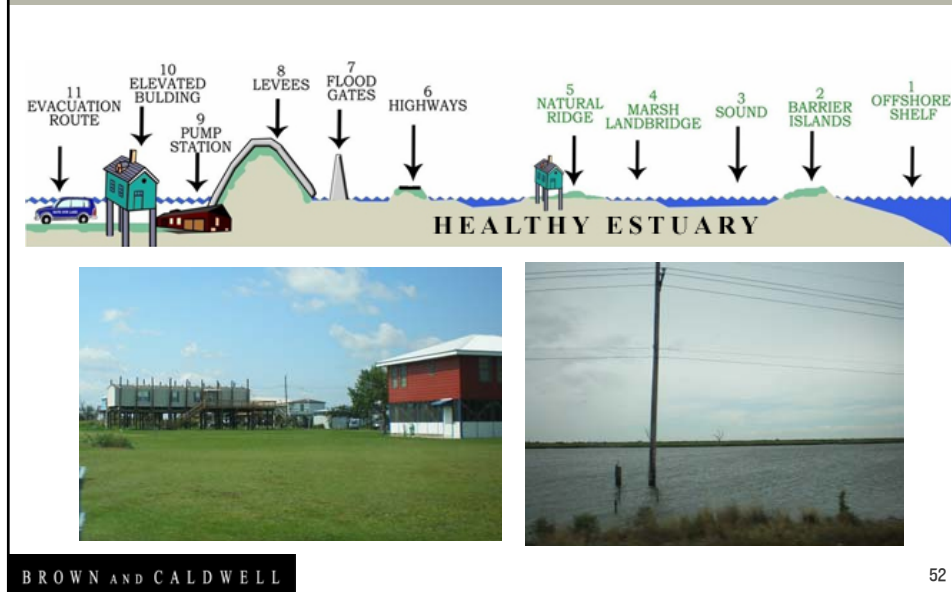


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Master Plan Concepts to Restore Sediment and Flow Balance



Sustainable Ecosystem – Multiple Lines of Defense



Annual Plan – Master Plan Implementation

- \$1.4B in state spending over next 3 years
- Long-term investment in Louisiana's future
- Looking ahead to 2012 Master Plan Update to better articulate a vision and targets for a sustainable coast

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CPRA
Coastal Protection and
Restoration Authority of Louisiana

FISCAL YEAR 2010 ANNUAL PLAN

Integrated Ecosystem Restoration and
Hurricane Protection in Coastal Louisiana
April 27, 2009

Questions and Discussion



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