Watershed Governance Structures & Funding Mechanisms

Considerations for a Colorado River Basin Restoration Initiative

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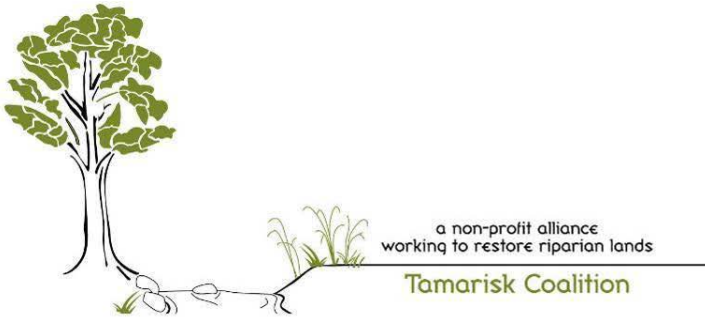

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Acknowledgements

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Executive Summary

This document summarizes governance structure information acquired during the analysis of watershed initiative case studies examined for the 2011 Tamarisk Coalition (TC) report *Sustainable Funding Options for a Comprehensive Riparian Restoration Initiative in the Colorado River Basin* (Tamarisk Coalition 2011), which will be referred to as the TC Sustainable Funding Report throughout this paper. This document's purposes are 1) to inform a discussion of governance structures that may be appropriate to manage a Colorado River Basin (CRB) Restoration Initiative and, 2) to inform governance structure discussions for Colorado River tributary restoration initiatives, given their respective political climates and potentially viable funding options.

Defining Governance Structure

For the purposes of this document, **governance structure** is defined as **the set of formal and informal rules, hierarchies, and mechanisms established to advance joint objectives by: 1) providing adequate leadership, direction, control, and coordination of individuals and organizations, and 2) establishing new statutes, resources, structures, and protocols where necessary.**

Literature review and case study synthesis yielded four major categories of governance structure: Model 1) the inter-organizational network; Model 2) the collaborative organizational form or "second-order organization"; Model 3) market structures; and Model 4) increasing capacity in existing organizations or agencies (Imperial & Koontz 2007). In addition, the role of hierarchical government, or meta-governance, will be discussed (Bell & Quiggin 2008).

Inter-organizational networks and **second-order organizations** both involve collaborative frameworks but differ in the extent of their formalized structure. **Market-based** structures can be generally defined as "structured interactions between organized economic agents" and must be carefully crafted to support restoration goals (Schilder 2000:53). An alternative to creating a *new* governance structure to address large-scale watershed restoration is **building capacity within an existing agency or inter-organizational network** (Imperial 2004). Finally, **meta-governance,** defined as "the government of governance" (Bell & Quiggin 2008:713), has been found to play an important role in supporting all forms of watershed-level restoration initiatives.

Case Studies

A number of case studies examined in the TC Sustainable Funding Report provide the basis for this governance structure analysis. Selected case studies were reframed in this document to focus on governance and its interactions with funding structures and, to the extent possible, regional politics (Appendix A). Each case study reexamined is representative of a particular category of governance structure, demonstrates particularly applicable lessons learned, or is situated in close proximity to the CRB. Case studies are listed below, along with the rationale for their selection.

- Multiple federal case studies – These case studies provide excellent examples of increased capacity in existing, hierarchical government as well as the need to create new governance structures to deal with complex, large-scale ecosystems.
- Chesapeake Bay Program (CBP) – One of the oldest watershed restoration efforts in the United States and the CBP has a governance structure that has persisted over time.
- Great Lakes – One of the oldest watershed restoration efforts in the United States and has a US-Canada international component, provides a comparison to the US-Mexico component of the CRB.
- European Union Water Framework Directive – Employs innovative water pricing and comprehensive restoration plan to support watersheds on a continental scale.
- Murray-Darling – Employs a top-down market approach to govern and fund restoration efforts on a large-scale in an arid region of Australia.
- Columbia River Basin – Employs a bottom-up market approach in the United States.
- California Bay-Delta (CALFED) – Has struggled to create an adequate governance structure and provides valuable lessons learned. Additionally its success or failure is particularly important as it shares water users with the Colorado River.
- Platte River –Involves two of the CRB states (Colorado and Wyoming) and is similar to the Upper Colorado River Endangered Fish Recovery Program.

Section 1: Governance Structures provides an overview of the four major categories of governance structure described above. **Table 1** pairs each case study with its particular form of governance structure, and provides information on the forms of meta-governance supporting or mandating each initiative.

Section 2: Sustainable Funding and Governance – Characteristics of Success defines sustainable funding and examines the types of funding mechanisms that were successful under each governance structure model.

Contextual factors that influence governance strategies are presented in ***Section 3: Watershed Case Study Lessons Learned***. A list of attributes, or components, associated with successful governance structures was developed from these lessons. ***Components of Successful Governance Structure*** can be found at the end of Section 2. To summarize, most successful governance structures have the following components:

- Trust, Funding, and Time
- An Effective Governance Structure
- Adequate Power to Drive Action
- A Recognized Problem (a crisis as a catalyst)
- Appropriate Scope
- Effective Leadership
- Appropriate Participation/Membership
- Properly Aligned Environmental, Economic, and Social Values
- Clear and Specific Goals
- Effective Implementation
- Adequate Regulation
- Adequate Authority
- Adequate Technical Resources
- Adequate Monitoring
- Adaptive Management
- Demonstration Projects
- Adequate Public Education and Relations
- Effective and Agreed Upon Decision Making Protocol(s)

Section 4: Contextual Considerations for the CRB provides an overview ofthe existing conditions in the CRB. **Table 2** provides general contextual considerations, paired with Tamarisk Coalition insights and recommendations on the special relevance of these issues to the CRB.

The Tamarisk Coalition's intent in preparing this document- to identify governance structures that may be appropriate for a CRB Restoration Initiative and for Colorado River tributary restoration initiatives- is embodied in ***Section 5: Governance Structure Viability in the CRB.***

This section breaks out the pros and cons of each governance structure model as it is realized in the case studies. **Table 3** then provides a summary of how these models and their challenges and successes inform future possibilities for the CRB.

The findings of this study indicate that overall the case studies with the most functional governance structures, i.e. those which have secured at least partially sustainable funding and have made the most environmental progress on the ground, have several important factors in common:

1) adequate meta-governance role and financial support, and 2) adequate inclusion of stakeholders, including local and private groups. A discussion of these factors constitutes ***Section 6: General Conclusions and Recommended Next Steps.***

All of this information, as well as the cases studies discussed in detail in Appendix A, inform the ***General Conclusions and Recommended Next Steps*** section. This section discusses how each of the general governance structures examined might be utilized for the CRB, considering the regional politics and the potential funding mechanisms that have been identified to date. It also outlines several next steps to engage in a more robust discussion of this topic.

General conclusions about each of the four broad governance structure categories are discussed in regards to their: 1) applicability to the CRB, 2) potential for buy-in, and 3) potential funding options. The discussion shows that there are pros and cons to any approach and that a myriad of options exist for combining several or all of them. The CRB is currently operating within a loosely based network structure. To close the current governance gap, the present network could either become more formally structured, or a second-order organization could be created within the existing framework. A market system could also be created within the existing network, a more formalized network, or a second-order organization. However, it is unlikely that a market system would effectively close the governance gap on its own, as none of the case studies examined effectively did so without a more formalized network or partnership (network or second-order organization).

In sum, based on our review of these nine case studies, a future CRB initiative will likely comprise a combination of these four governance structure models. The exact construct of a future CRB initiative should be driven by the type of meta-governance in place and an increased understanding of existing collaboration efforts throughout the CRB.

Acronym List

ACCC	Australian Competition and Consumer Commission
AoC	Areas of Concern
ARW	Australian Water Resources
AWR	Australian Water Resources
AZ	Arizona
BBCAC	Bi-State Blue Crab Advisory Committee
BDCP	Bay Delta Conservation Plan
BEF	Bonneville Environmental Foundation
BOR	Bureau of Reclamation
BPA	Bonneville Power Administration
C2K	Chesapeake 2000 Agreement
CA	Cooperative Agreement
CA	California
CALFED	California Bay-Delta Program
CBC	Chesapeake Bay Commission
CBP	Chesapeake Bay Program
CBWBRFP	Chesapeake Bay Watershed Blue Ribbon Finance Panel
CBWTP	Columbia Basin Water Transactions Program
CCC	Commodity Credit Corporation
CEQA	California Environmental Quality Act
CEWH	Commonwealth Environmental Water Holder
CIRCA	Communication Information Resource Center Administrator
CNRA	California Natural Resources Agency
CNREP	Center for Natural Resources and Environmental Policy
CO	Colorado
COAG	Council of Australian Governments
COID	Central Oregon Irrigation District

CRB	Colorado River Basin
CRC	Chesapeake Research Consortium
CVPIA	Central Valley Project Improvement Act
CWA	Clean Water Act
DE	Delaware
DOI	US Department of the Interior
DRC	Deschutes River Conservancy
EC	Environment Canada
EC	European Commission
EEA	European Environment Agency
EIS	Environmental Impact Statement
EPA	Environmental Protection Agency
ESA	Endangered Species Act
EU	European Union
FERC	Federal Energy Regulatory Commission
FPA	Federal Power Act
GDP	Gross Domestic Product
GLNPO	Great Lakes National Program Office
GLQWA	Great Lakes Water Quality Agreement
GLRC	Great Lakes Regional Collaboration
GLRI	Great Lakes Restoration Initiative
GLSF	Great Lakes Sustainability Fund
GLWQA	Great Lakes Water Quality Agreement 1987
HOW	Healing Our Waters
IA	Intergovernmental Agreement
IATF	Great Lakes Interagency Task Force
ICUN	International Union for Conservation of Nature
IJC	International Joint Commission
LAO	Legislative Analyst's Office
MD	Maryland
MDB	Murray-Darling Basin

MDBA	Murray-Darling Basin Authority
MOA	Memorandum of Agreement
NAWCA	North American Wetlands Conservation Act
NAWMP	North American Waterfowl Management Plan
NEP	National Estuary Program
NEPA	National Environmental Policy Act
NFWF	National Fish and Wildlife Foundation
NGOs	Non-governmental Organizations
NM	New Mexico
NMFS	National Marine Fisheries Service
NPPD	Nebraska Public Power District
NRCS	National Resource Conservation Service
NV	Nevada
NWC	National Water Commission Act
NWI	National Water Initiative
NWPCC	Northwest Power and Conservation Council
NY	New York
PA	Pennsylvania
PA	Pennsylvania
RAP	Remedial Action Plans
RBD	River Basin Districts
ROD	Record of Decision
RWG	Regional Working Group
SDL	sustainable diversion limits
SOLEC	State of the Lakes Ecosystem Conference
SPWRAP	South Platte Water Related Activities Program
STAC	CBP Scientific and Technical Advisory Committee
TC	Tamarisk Coalition
TNC	The Nature Conservancy
UN	United Nations
UNDESA	United Nations Department of Economic and Social

	Affairs
US	United States
USACE	US Army Corps of Engineers
USFWS	US Fish and Wildlife Service
UT	Utah
VA	Virginia
WFD	Water Framework Directive
WP	Willamette Partnership
WRC	Water Resource Certificate
WWT	Washington Water Trust
WY	Wyoming

Background and Introduction

Purpose

This document summarizes governance structure information acquired during the analysis of watershed initiative case studies examined for the 2011 Tamarisk Coalition (TC) report *Sustainable Funding Options for a Comprehensive Riparian Restoration Initiative in the Colorado River Basin* (Tamarisk Coalition 2011). This document's purposes are: 1) to inform a discussion of governance structures that may be appropriate to manage a Colorado River Basin restoration initiative and, 2) to inform governance structure discussions for Colorado River tributary restoration initiatives given their respective political climates and potentially viable funding options.

The Issue

The Colorado River is one of the most critically important sources of fresh water in the western United States (US), sustaining agriculture, power generation, municipal and industrial water demands, and ecosystems across seven states [Arizona (AZ), California (CA), Colorado (CO), Nevada (NV), New Mexico (NM), Utah (UT) and Wyoming (WY)] and northwestern Mexico, including some of the fastest growing urban and industrial areas in the nation [Bureau of Reclamation (BOR)].While the Colorado River and its tributaries have been extensively engineered to provide a steady supply of water and hydropower to cities, farms, and industry, increasing demand has caught up with an over-allocated and drought-impacted supply (Berggren et al 2010, Kenney 2010). Water supply and demand imbalances already exist in some portions of the Colorado River Basin's (CRB), and are expected to increase in magnitude and extent in the future (BOR). Population growth and energy development will continue to intensify demand, while climate change is expected to reduce annual flows and increase the frequency and intensity of drought events (Berggren et al. 2010, Kenney 2010). These challenges have the potential to severely impact regional economies and quality of life for inhabitants of the CRB, and further degrade the ecosystems that surround, support, and are supported by the Colorado River.

The Colorado River Basin's water budget is not balanced. Annual water supplies are not sufficient to meet current and ever increasing demands (Kenney 2010). As a result, southwestern citizens depending on the CRB will almost certainly face water shortages in the near future. Such shortages will be doubly damaging due to regional economic dependence on this over-allocated and diminishing water supply. These challenges severely threaten the quality of life for inhabitants of the CRB and, potentially, of the nation (e.g. decreased food production in the region.

In the face of such water shortages, there is growing public interest in slowing and reversing, (to the extent possible) environmental health and ecosystem service degradation in the CRB. Such a task will require an effort as calculated and innovative as the challenges are complex and unpredictable. For the purposes of this paper, this effort is referred to as a theoretical *Colorado River Basin Restoration Initiative*.

Though numerous, fragmented efforts currently underway support improvement of the CRB, no collaborative basinwide initiative exists at present. The CRB encompasses a large geographic area including portions of seven states and disjointed population centers that depend on an extensive hierarchal network of large and small watersheds. Currently, a loose network of agencies and organizations within the CRB are working to address common resource concerns and mandates, but each of these groups is autonomous and the manner in which they inter-relate is informal. The aforementioned TC Sustainable Funding Report (2010) discussed potential methods of funding a Colorado River basinwide effort. Building on that report, this document addresses how a CRB restoration initiative might be governed.

Watershed management is inherently complicated and often, under current policies, the capacity and authority to address these complexities are widely dispersed. As a result of this dispersed authority, land management agencies typically: 1) fragment or duplicate responsibility, 2) use information and resources inefficiently, and 3) operate under inconsistent policies across all governmental levels (Imperial 2004). As a result, environmental health and ecosystem function often suffer. In many circumstances, current policies are not adequately balancing human consumptive needs with environmental protection or restoration needs at a watershed scale. One researcher even went so far as to state that the water crisis being experienced across the globe is more indicative of a governance failure than a lack of *physical* water supply (Aylward 2009). The degree to which this assertion is true is up for debate, but what is commonly understood is that traditional and current water governance lacks efficiency. This lack of efficiency is referred to as a *governance gap* (CNREP 2009).

To combat the inefficiencies of the governance gap, large-scale restoration projects have been trending toward collaboration across multiple political boundaries. Watershed scale collaboration often involves numerous government agencies, non-governmental organizations (NGOs), citizen groups, and the public at large. Collaborative partnerships are intended to complement, rather than replace, traditional agencies. The trend of collaboration began in earnest in the 1990s (e.g. CALFED) and has continued to gain momentum among environmental advocacy groups and government agencies alike (Sabatier et al 2005).

Governance Structure Definition

In order to organize sustainable and functional collaboration it is essential to craft a structure that will support the scope of project work and effectively involve necessary partners. For the purposes of this discussion, this organizing structure is referred to as a *governance structure.* The defining characteristics of governance structure are*:* 1) "governance refers to the means for achieving direction, control, and coordination of individuals and organizations with varying degrees of autonomy in order to advance joint objectives", 2) governance "includes formal and informal rules, social norms and structures that govern relationships between organizations", and 3) governance involves not only the configuration of existing entities, but can also create "enabling statutes, organizational and financial resources, programmatic structures and administrative rules and routines" (Imperial 2004:2). This information was interpreted to form the following definition of governance structure, which will be the definition used in this text:

G**overnance structure** is defined as **the set of formal and informal rules, hierarchies, and mechanisms established to advance joint objectives by: 1) providing adequate leadership, direction, control, and coordination of individuals and organizations, and 2) establishing new statutes, resources, structures, and protocols where necessary.**

The second part of this definition – particularly "enabling new statutes" - introduces the need for an important distinction between *government* and *governance*. Governance structures operate "in the shadow of hierarchy" (Scharpf 1994). That hierarchy is government, or as Bell and Quiggin (2008) discuss, *meta-governance*. Meta-governance is defined as "the government of governance" (Bell & Quiggin 2008:713). Substantial and well executed meta-governance that supports the goals and needs of a given governance structure is essential to the ultimate success of the structure. The meta-governance concept will be more thoroughly discussed in the *Governance Structure* section below.

Governance Structure Assumptions

This document assumes that due to the vast and broad stakeholder group that would likely be involved in a CRB Restoration Initiative, a consensus, or collaborative approach will be needed on some level. There is some indication that leaders in the CRB increasingly value discussion and negotiation over litigation, and inclusion of a broad stakeholder base in the decision making process (CNREP 2011). Thus, this document focuses on what is currently known about such collaborative approaches to watershed management.

It is worth noting that there is little to no empirical evidence proving whether such collaborative governance structure approaches have a positive or negative effect *on the ground* to environmental health (Thomas 2008, Kenney 2000). Monitoring efforts from several of the large-scale case studies reviewed in the Sustainable Funding Report do show some environmental improvements as a result of these collaborative restoration efforts (Tamarisk Coalition 2011). Today the collaborative governance approach to watershed management is still a largely unproven, though increasingly popular, method (Kenney 2000). Thus, it is important to recognize that, in order to ensure that progress is made, "collaborative governance should be held to environmental performance standards, just like other governance systems" (Thomas 2008:2). For more information on the case studies, see Appendix A.

Since it is difficult to quantify whether such groups achieve success on the ground (Kenney 2000), this document operates under the assumption that if a watershed effort can persist over time it has a better chance of improving efficiency and thus achieving, or at least working toward, success.

Analytical Framework

While examining funding mechanisms of watershed management case studies for the Sustainable Funding Report, information about the governance structure that managed these funding sources was also gathered. This information was incorporated into the Sustainable Funding Report in the form of "programmatic lessons learned". To ensure that this information was better captured, many case studies examined in the TC Sustainable Funding Report were reframed in this document to focus on governance and its interactions with funding structures and, to the extent possible, regional politics (Appendix A). Each case study reexamined is representative of a particular category of governance structure,

demonstrates particularly applicable lessons learned, or is situated in close proximity to the CRB. Case studies are listed below, along with the rationale for their selection.

- Multiple federal case studies – These case studies provide excellent examples of increased capacity in existing, hierarchical government as well as the need to create new governance structures to deal with complex, large-scale ecosystems.
- Chesapeake Bay Program (CBP) – One of the oldest watershed restoration efforts in the US and, the CBP has a governance structure that has persisted over time.
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- Platte River –Involves two of the CRB states (Colorado and Wyoming) and is similar to the Upper Colorado River Endangered Fish Recovery Program.

Section 1: Governance Structures

Governance structure is directly linked to the strategies and processes an organization employs (Imperial & Koontz 2007). It is laborious to create a watershed management structure, and the highest risk of organizational failure exists in its early stages (Imperial 2004 & Imperial and Koontz 2007). If not well planned, program governance structures can become as complicated, confusing, and fragmented as the many regulations they are meant to coordinate or replace.

There are four models of governance structure that will be discussed in this document: Model 1) the inter-organizational network or "network", Model 2) the collaborative organizational form or "second-order organization", Model 3) market structures, and Model 4) providing resources and capacity building support to existing organizations or agencies (Imperial & Koontz 2007). In addition, the role of hierarchical government, or meta-governance, will be discussed (Bell & Quiggin 2008).

Model 1. Inter-organizational Networks

Inter-organizational networks are defined as a "structure of interdependence involving multiple organizations that exhibit some degree of structural stability but include both formal and informal linkages and relationships" (Imperial & Koontz 2007:4). In the context of watershed management, an inter-organizational network would be defined by geography or the collection of organizations involved. Such networks can be fairly structured. They can create inter-organizational working groups and task forces, complete a watershed plan, and set priorities and policies. These plans and policies can be formalized in MOUs, an accepted watershed management plan, or by being incorporated into individual agency rules.

Model 2. Second-order Organizations

A second-order organization can be thought of as "an organization of organizations" (Imperial & Koontz 2007:1). A second-order organization is formed when "a group of individuals or organizations embraces collaborative processes, makes joint decisions, and acts as a single entity" (Imperial & Koontz 2007:5).

What separates second-order organizations from networks is their authority structure. Networks employ informal implementation guided by social exchange mechanisms such as communication, relationships, mutual interests, and reputation. They lack the strength to require administrators to follow all regulations during implementation (Imperial 2004). Employing mainly social and consolatory methods - such as mutual benefit, trust, and reciprocity – networks have no real regulatory teeth (Imperial & Koontz 2007). Networks rely largely on "social norms and peer pressure" at all levels to enforce agreements (Imperial 2004:11). In contrast, second order organizations have more clearly articulated rules and regulations and more enforcement power. The second-order organization is a hierarchical governance structure because it does not rely on trust but on organizational rules and hierarchy to define rights and responsibilities and to govern behavior. There is some level of autonomy enjoyed in the network form of governance that is relinquished in the second-order structure (Imperial & Koontz 2007). This does not mean that the two governance forms are mutually exclusive. Second-order organizations often exist within a broader inter-organizational network, serving to enhance its governance through coordination, organization, facilitation, and by serving as a catalyst for action (Imperial & Koontz 2007).

The terms "partnership", "collaborative", and "cooperative" are used interchangeably in this report. Each was chosen to reflect the language used by the watershed management efforts on their respective websites. All three of these terms describe various network structures or second-order organizations. Often it is difficult to discern whether a structure is fully a network or a second-order organization as they exist on a somewhat sliding scale. Therefore they are listed below as follows:

Less formal/More Consensus Based/More Autonomy

Very Formal/Rule Based/Less Autonomy

Model 3. Market-based Governance Structures

A market-based governance structure can be defined as a *structured interaction between organized economic agents* (Schilder 2000:53). Markets essentially facilitate an exchange of certain goods or services between buyer and seller. In the western US dams, water storage facilities, and water transport infrastructure have allowed river flows to be captured in market systems such as those driven by food, power, and drinking water. As a result, water is currently capable of moving from lower value to higher value economic uses, principally from agriculture to municipal uses (Aylward 2009). In this sense, water markets already exist throughout the western US and in the CRB.

There are two avenues for increasing efficiency and sustainability of water use: 1) improving the physical efficiency of water use through new technologies, and 2) increasing the economic efficiency of water allocation (Aylward 2009). Examples of the former include the application of technologies such as desalinization, water reuse, rainwater, and replacing unlined water conveyance ditches with pipelines to reduce seepage and evaporation (Aylward 2009). Reallocation of water, however, has proven to be more challenging. Generally there is little political will for administrative reallocation in which a collective body can reassign water use rights with or without compensation. Therefore, market-based voluntary reallocation, in which a collective body creates a market framework- or market governance structure- driven by legal and economic incentives is favored in the US (Aylward 2009).

Water can be returned to the environment in two ways: 1) through administrative reallocation in which a collective body (i.e. the state or other body) can reassign water use rights with or without compensation, and 2) through market-based reallocation in which a collective body creates a market framework - or market governance structure - for voluntary reallocation, including legal and economic incentives. There is little political will for the first option and so the second, a market-based system, is favored in the US (Aylward 2009). It is worth noting that in Australia's Murray-Darling watershed market mechanisms of addressing environmental concerns are failing. In response, Bell and Quiggin (2008) suggested a shift to the option of administrative reallocation.

Currently there is no *counterbalancing rule of incentive* to keep water in undervalued uses such as ecosystems (Aylward 2009:2). This failure to address ecosystem needs is partially due to freshwater ecosystem benefits being difficult to quantify and to the fact that they were not considered in early water codes. Now these benefits are better understood and documented but still not properly accounted for in existing water markets. This lack of counterbalancing incentive can be seen as a failure of current water market governance (Aylward 2009).

Freshwater ecosystem services and benefits are difficult to quantify, and were not considered in early water codes. Now these benefits are better understood and documented, but still not properly accounted for in existing water markets. For a water market to succeed in improving environmental health it must: 1) know and acknowledge that rivers and streams need more water; 2) have legislation in place to support reallocation of existing water rights to ecosystems via water markets; 3) know where the water should go (information from scientists and environmentalists); 4) empower/enable state officials to process transfers; 5) develop a process for creating transfers; and 6) identify a source of funds for purchasing the flows (Aylward 2009). Number one speaks to the need for a problem to be acknowledged before action is possible. Numbers two through five address the need to create an adequate governance structure that can properly produce and distribute the *supply* of water transfers. Number six speaks to the necessity of adequate *demand* for water transfers for a market structure to succeed. In short, establishment of an inclusive water market does not by itself guarantee environmental restoration. The missing ingredients are money to fund transaction costs and water acquisitions and the organizational capacity to carry out the transactions (Aylward 2009:6).

To establish a water market, a *supply* of instream water transfers must be created along with a governance structure that enables their transfer to desired locations. In the case of a watershed restoration initiative, desired locations include ecosystems. To accomplish this, an ecosystem, or "instream" use must be a legal and permitted beneficial use of water. Water codes must permit both the purchase of a water use rights and a change in use designation, to allow the water to benefit the ecosystem. Additionally, to enable a level playing field for environmental buyers, the state must authorize the transfer of existing water rights to environmental purposes without loss of priority (Aylward 2009).

If the proper rules and regulations are not created, market systems directed to increase environmental flows or payments for ecosystem services will not succeed. For example, the market based water trading utilized by the Murray-Darling Watershed in Australia resulted in an increase in consumptive use in the agricultural sector. This increased the country's gross domestic product (GDP) but did not support the environmental flows that were anticipated as an aspect of this project (Bell & Quiggin 2008).

State by state and basin-by-basin policy reform to facilitate supply is challenging but "the financial challenge is paramount" (Aylward 2009:7). In order for a market to be successful, there must be a *demand* for the good supplied (i.e. environmental flows). The demand for instream flows can be regulatory in nature, such as in response to Endangered Species Act (ESA) requirements, or voluntary, usually related to some form of incentive program.

Currently creative uses of public funding and regulatory drivers are catalyzing the demand for instream water rights in the current water market systems. However, as in the large-scale watershed examples in the TC Sustainable Funding Report case studies, it is unlikely that public funds and regulatory actions alone will be able to purchase enough water rights to restore watersheds at large. It is likely that the largest contribution that the public sector will have is to drive demand through regulation. Thus, the challenge is to effectively drive public demand. Some efforts to accomplish this task include (Aylward 2009):

- Eco-labeling
- Certification programs

- Offsetting water use
- Watershed based payments for ecosystem services through mandatory fees
- Municipal water restoration donation programs - check off option on monthly bill
- Corporate partnerships with environmental organizations to fund conservation
- Global water stewardship initiatives to support voluntary stewardship
- Voluntary credit systems providing instream water transactions for purchase

An additional market structure challenge comes in the form of identifying funding for transaction, administration, and compliance and environmental monitoring costs. These are important needs that cannot often be met by transaction agents and need to be considered (Aylward 2009). This is additionally troubling in a water market setting where transaction costs are high. Higher costs are due to the fact that water markets are thin (few buyers and sellers), supply and demand issues are uncertain and complex, and water is not of uniform quality (Bell & Quiggin 2008).

Model 4. Building Capacity in Pre-Existing Organization or Agency

Another option to support a CRB initiative would be to build capacity within an existing agency or inter-organization network (Imperial 2004). If this option is chosen it is important to consider the implications of the existing agency's or inter-organizational network's affiliations and history. It has been shown that their past successes will greatly impact the likelihood of leading a successful new initiative. Essentially, agencies are entrenched to a certain degree in their existing processes and philosophies, often adopting strategies defined by the parent organization instead of by the initiative (Imperial & Koontz 2007, Bidwell 2006). Agency led initiatives also tend to focus less on scientific assessment and more on project implementation than do unaffiliated governance structures (Bidwell 2006). While this could be seen as a benefit from an efficiency standpoint, numerous large-scale restoration projects (i.e. Chesapeake Bay, Great Lakes) claim that their science programs are essential to overall success (Tamarisk Coalition 2011).

Many of the Federal Case Studies from the TC Sustainable Funding Report provide examples of increasing existing organization capacity; such as the Pittman-Robertson Act, Dingell-Johnson Sport Fish Restoration Act, and Harbor Maintenance Trust Fund. However, these case studies address targeted issues, such as specific wildlife habitat conservation or infrastructure maintenance issues. In general, policies and structures addressing these issues were seen as sufficient to improve resources, but funds were lacking (Appendix A).

In contrast, two Federal Case studies [i.e. North American Wetlands Conservation Act (NAWCA) of 1989 and the US Commission on Ocean Policy] and numerous Large-Scale Watershed Case Studies opted to create new governance structures to address issues that current policy was not adequately addressing. Case studies addressing complex, dispersed environmental problems were those that created new governance structures (Appendix A). Restoring the CRB will involve addressing many similar complexities involving numerous environmental issues and spanning many agencies. Thus, it is likely that a new structure will be necessary to provide similar funding mechanisms for the CRB initiative.

Meta-Governance (Government or Hierarchy Governance)

In addition to governance structure, an important aspect of watershed collaboration is the meta-governance of that structure. Governance structures operate "in the shadow of hierarchy," under the ultimate authority, legitimacy, and accountability of the government, or meta-governance (Scharpf 1994, Bell & Quiggin 2008). According to Bell and Quiggin (2008:713), meta-governance is "the government of governance". They further stated: *Meta-governance is essentially a normative or prescriptive concept, outlining the things government should do in relation to effectively managing governance arrangements* (Bell & Quiggin 2008:725).

State and federal *government* statutes are the law of the land in the US and cannot be supplanted by actions taken by regional watershed management network or market governance structures. However, these governance structures can influence the enforcement power of statutes. For example, the Great Lakes restoration initiative was able to heighten Clean Water Act (CWA) requirements to reach its regionally focused goals (Renner 1995). In contrast, the Platte River and California Bay-Delta collaborative programs were feared to weaken the ESA by focusing more on a consensus based process of decision making than the US Fish and Wildlife Service's (USFWS) scientifically determined recommendations (Echeverria 2001, Aiken 1989).

In market structure models the interplay of structure and meta-governance is especially dynamic since markets are not formally regulated. Bell and Quiggin warn against vesting too much confidence in the self-regulating abilities of market or network governance structures, stating "this conceptualization (sic) is far removed from the notion of 'self-regulating' markets (or even self-organizing (sic) networks) and challenges the view that new devolved instruments can somehow help make up for declining central government" (2008:725)

They postulated that thinking of a governance structure as an active public-private partnership, where the role of government is appropriately respected and employed, is a necessary step forward, although admittedly a difficult one.

Second-order organization governance structures have a somewhat different relationship to meta-governance as they have more clearly articulated rules and regulations and more enforcement power. The second-order organization is a hierarchical governance structure because it does not rely on trust but on organizational rules and hierarchy to define rights and responsibilities and to govern behavior (Imperial & Koontz 2007). This enforcement power is likely derived from meta-governance statutes.

In each of the case studies presented in this study, the statute of authority backing each governance structure is listed as a means of recognizing the ultimate enforcement authority of government, or meta-governance driving that effort.

Categorized Case Study Governance Structures

Table 1 provides an overview of the case studies examined in Appendix A and provides an assessment of the success of the governance structure model in allowing the relevant agencies or organization to 1) have the authority/capacity necessary to carry out their work and persist over time; and 2) accomplish their stated environmental goals. For the purposes of this table, the success of a particular governance structure model is determined by these two factors. The governing structure categories and supporting meta-governance displayed in the table below were identified in the case study review and will be discussed in this paper. The governance categories are based on the terms described in the section above.

For a full explanation of the terms and categories chosen below, please see the individual case studies in Appendix A. Please note the case studies are presented in the same order they are presented in Appendix A.

Table 1: Summary of Governance Structures and Funding Mechanisms

Case Study	Governance Structure Model	Meta-governance	Assessment of Governance Structure	Funding Mechanisms	Assessment of Sustainability of Funding Mechanisms	
					Significance	Reliability
Large Federal Programs – Single Agency (pg. A.3 - A.6)	Model 4. Building Capacity within an Existing Agency	Embedded in federal government through new statutes.	Successful • Structure allows agencies to expand their capacity • Agencies able to work towards environmental improvement goals (except for Harbor Maintenance Trust Fund)	Ad Valorem Taxes	Moderate to High	Low to High
				Duck Stamp sales	Moderate	High
				Oil and gas royalties	High	High
				Motor vehicle and fuel related taxes	High	High
Large Federal Programs – Multiple Agency (pg. A.3 – A.6)	Model 1. Network	Embedded in federal government through new statutes.	Successful • Structure supports operations • Agencies able to work towards environmental improvement goals	Appropriations	Varies	Low
				Non-Compliance Fines and Penalties; Excise Taxes	Moderate	High
				Oil and gas royalties	High	High

Case Study	Governance Structure Model	Meta-governance	Assessment of Governance Structure	Funding Mechanisms	Assessment of Sustainability of Funding Mechanisms	
					Significance	Reliability
Chesapeake Bay Program (CBP) (pg. A.7 – A.17)	Model 2. Second-order organization	Embedded in federal government through the Clean Water Act.	Mostly successful • Organization has persisted over time and maintained an adequate level of funding. • Specific environmental issues have been addressed albeit at a slow pace due to lack of prioritization. • Different states have varying levels of success in managing CBP goals; sometimes this is a result of the varying levels of impact within respective jurisdictions. • Targeted research (e.g. Blue Crab) was successful until funding ended.	Federal appropriations (CWA)	Low to Moderate	Low to Moderate
				State Appropriations, Funds and Trusts	Low to Moderate	Low to High
				Farm Bill - Commodity Credit Corporation	Moderate	Low
				Grants	Unknown	Unknown
				Municipal wastewater fee	Moderate	High

Case Study	Governance Structure Model	Meta-governance	Assessment of Governance Structure	Funding Mechanisms	Assessment of Sustainability of Funding Mechanisms	
					Significance	Reliability
Great Lakes Restoration (pg. A.18 – A.27)	Model 1 and 2. Network (led by a second-order organization)	Embedded in 1) international treaties and Great Lakes Water Quality Agreement 1987 (GLWQA); 2) US federal government through Section 118 of CWA; 3) Canadian government through the Canada-Ontario Agreement Respecting the Great Lakes	Mostly successful • International Commission has persisted over time but has stagnated. • Agencies are able to work towards environmental improvement goals but sometimes scope of goals is too limited. • Organized state, local and province engagement has persisted over time and has significantly facilitated restoration.	Federal appropriations	Moderate	Low to High
				Great Lakes Sustainability Fund 2000	Moderate	Moderate
				State Bonds	Moderate	Low
				Grants (private foundations)	Moderate	Moderate
				Great Lakes Protection Fund	Moderate	High
				Multi-State endowment	Moderate	High
				Public conservation funds matched with private contributions	Unknown	Unknown
				Great Lakes Revolving Loan Fund	Moderate	Unknown

Case Study	Governance Structure Model	Meta-governance	Assessment of Governance Structure	Funding Mechanisms	Assessment of Sustainability of Funding Mechanisms	
					Significance	Reliability
EU Water Framework Directive (pg. A.28 – A.35)	Model 2.Second-order network	Embedded through a statute of the European Union.	Success unknown • New legislation has inspired collaboration. • Impacts of legislation on environment unknown, however, the numbers of restoration projects is increasing and monitoring is enforced.	Member-state contributions from general funds. EU budget Water pricing	Unknown High Unknown	Unknown Unknown High
Murray-Darling (pg. A.36 – A.45)	Model 2. Second –order organization and Model 3. Market Structure	Embedded in Australian federal and regional legislation.	Not yet successful • The organization has persisted over time but its market based plan to achieve its environmental goals is not working. • Environmental effects are not well known and known goals have not been achieved.	Guaranteed federal funding for 10 years. Water for the Future Program (Cap and Trade Water Market)	Moderate Unknown	Low Unknown

Case Study	Governance Structure Model	Meta-governance	Assessment of Governance Structure	Funding Mechanisms	Assessment of Sustainability of Funding Mechanisms	
					Significance	Reliability
Columbia River Basin (pg. A.46 – A.55)	Model 1. Network	Based in efforts to comply with federal regulations (ESA)	Somewhat successful • Network persisted over time and was eventually formalized into the Columbia Basin Water Transactions Program (CBWTP). • Instream flows and other conservation efforts are occurring but overall environmental goals being accomplished are unclear. • Several market accounting systems have been created and the Willamette Partnership is planning to look at how they are affecting the environment.	Hydro-electric energy fees from the Bonneville Power Administration as required by National Environmental Policy Act (NEPA) and ESA	High	High
				Voluntary donations via water bills	Low	Moderate
				Federal appropriations and American Recovery and Reinvestment Funds	High	Low
				Selling water rights	Unknown	Unknown
				Grants	High	Low

Case Study	Governance Structure Model	Meta-governance	Assessment of Governance Structure	Funding Mechanisms	Assessment of Sustainability of Funding Mechanisms	
					Significance	Reliability
California Bay-Delta Program (pg. A.56 – A.66)	Model 2. Second-order organization	Based on requirements in the ESA	Not successful • Network (CALFED) did not persist over time; however subcommittees and action groups survived. • The health of the bay declined over the life time of CALFED – but perhaps more slowly than it would have otherwise, this is unknown.	Federal appropriations	Low	Low
				State Bonds	Moderate	Low
				Ad Valorem Tax	High	Low
Platte River (pg. A.67 – A.75)	Model 1. Network	Based on requirements in the ESA	Success unknown • The committee has persisted over time and seems to be adequately structured. • Existing government agencies and states are staying engaged. • Environmental goals identified; progress on meeting goals unknown.	Federal appropriations (Consolidated Natural Resources Act of 2008)	High	Moderate
				State contributions (CO Species Conservation Trust Fund (construction & severance tax fees); NE – in kind, WY – unknown).	High	Moderate
				Membership fees paid by water users	Moderate	Moderate
				In-kind contributions	Moderate	Moderate

Section 2: Sustainable Funding and Governance- Characteristics of Success

Sustainable funding can be defined as, **a revenue stream that is sufficient in magnitude to accomplish a program's goals and reliable enough to support long-term maintenance and monitoring programs** (Tamarisk Coalition 2011).

The Tamarisk Coalition found that none of the case studies examined has achieved sustainable funding that meets the requirements of this definition (Tamarisk Coalition 2011). However, several of the case studies do have funding mechanisms that meet portions of the above definition (e.g. a mechanism that is reliable but not large). These case studies' funding sources can be thought of as sustainable at some level of operation although below the ideal. The Chesapeake Bay Program, the Great Lakes, the Platte River, the Columbia River Basin, and the multiple federal case studies all fall into this *partially sustainable* category. These are also the case studies that seem to have the most functional governance structures and that boast the most environmental progress made on the ground.

A level of financial support is provided to each of the partially sustainably funded case studies through US federal Legislation, or meta-governance. The Chesapeake Bay and the Great Lakes Environmental Protection Agency (EPA) leadership are funded through CWA Sections 117 and 118 respectively. The Consolidated Natural Resources Act of 2008 pledged to fulfill the federal portion of Platte River recovery funds. Columbia's Bonneville Power Administration is required to provide environmental restoration funding for the region through the 1980 Northwest Power Act.

Meta-governance funds can support an adequate governance structure, as in the Chesapeake Bay Program, or be utilized by grassroots governance structures, as in the Columbia Basin case study. Well supported governance structures seem more likely to include diverse stakeholders - including states, localities, and the private sector. Gaining the interest, trust, and involvement of these sectors through legislative seed money brings them into the process and widens the potential funding base. It is here that the most innovative funding mechanisms are seen. For example, at the state level Maryland has created several dedicated funding sources such as the flush fee which is a tax on waste water management listed on property tax bills. Private funds can be similarly creative, such as the South Platte Water Related Activities Program were Colorado water users pay a voluntary fee to gain a seat at the table in the Platte River restoration process.

The Chesapeake Bay and the Great Lakes both enjoy significant financial support from states and private organizations. The more narrowly focused Columbia River Basin, Platte River, and North American Waterfowl Management Plan (NAWMP) are more closely tied to private than state funds. This ability to tap into diverse funding streams from different sectors allows these programs to weather harsh economic climates more readily and to persist over time, a large factor in success. The financial support of the initial federal legislation is not guaranteed in perpetuity, but if it sparks a more robust mosaic of funding sources, it may no longer be needed.

In contrast, the California Bay-Delta Program (CALFED) and Murray Darling case study do not enjoy adequate meta-governance, or localized and private financial support. The California Bay-Delta did not enjoy a dedicated federal funding source required by legislation and relied almost

exclusively on state bonds with no private participation or funds. What funding did come from the federal government was largely supplied by the BOR for restoration efforts. This lack of diversification or an even partially sustainable funding plan was an enormous hindrance to the program.

Water purchases for the environment are financially supported by the government in the Murray Darling basin until 2018 through the Water for the Future program. However, its top down nature neglected to elicit local or private parties to support the market structure and its environmental goals. Private parties are almost exclusively involved in the market as sellers of water rights. This is not a sustainable situation unless demand can be increased, and this is unlikely unless more stakeholders buy-in to the goals and the processes.

The European Union (EU) Water Framework Directive (WFD) is relatively untried and it is difficult to judge how it is progressing. While it does have the makings of sustainable funding structure required in meta-governance legislation in the long-term, it has no short-term funding plan to support individual countries (i.e. to provide start-up funds and to conduct economic reports to determine appropriate water pricing). This could be a stumbling block given the varied economies of member states.

In the case of CALFED, the lack of sustainable funding was due to an over-reliance on state bonds. Nelson (2010) states, "The CALFED failure taught us the dangers of relying on public funds." The evidence of these case studies would suggest that this is true and that private and more localized funding sources are a big key to the success of a watershed restoration initiative. But it also seems that public funding does have a large role to play in creating reliable, if insufficient, funding to seed and sustain these efforts. Even a relatively small, reliable source of funding can sustain a program over time and encourage further contribution.

It has been shown that formalized governance structures are more stable, and persist over time more readily than loosely based networks (Imperial & Koontz 2007). Since it is very difficult to quantify whether such groups achieve success on the ground (Kenney 2000), this document operates under the assumption that if a watershed effort can persist over time it has a better chance of improving efficiencies and thus achieving, or working toward, success. The following *propositions*, based on preliminary evidence from Imperial and Koontz (2007), explain characteristics which contribute to a collaborative organizations' likelihood of survival:

- **Exhibit high reliability**.
- **Exhibit high accountability and do not create incentives for nonparticipation**.
- **Create a reproducible structure**. (i.e., institutionalized rules, routines, and procedures)
- **Create formal rules**. In contrast to informal rules, which can vary under different circumstances, formal rules increase an organization's legitimacy because they institutionalize the organization's process. The creation of formal rules is more likely to occur as an organization increases the scope of its membership, strategy, decision, and coordination rule structures. All participating organizations and agencies must agree to these rules in order for them to be successful.

- **Establish a high level of legitimacy especially at an early stage** (i.e. adopt formal rule structures early on). This will help the organization avoid the high rate of failure, or death, experienced by young organizations.
- **Attempt to avoid major membership, strategy, decision, and coordination rule structure changes**. In early stages such changes increase the risk of organizational mortality and in later stages the organization's risk of death reverts to that of a young organization.
- **Persist over time**. Older collaborative organizations will have higher reliability and accountability than younger groups, be more likely to have more reproducible structures, and will be viewed by members of the inter-organizational network as more legitimate than younger groups.

However, the stability that lends itself to longevity and, by proxy, an assumed greater level of success can also make it difficult for the structure to adapt to changing "political, social, economic, or watershed conditions" (Imperial 2004:15). A stable structure can overcome this weakness if it is able to "routinize" change through structured channels (Imperial and Koontz 2007:18), essentially institutionalizing adaptive management.

While the chances for institutional longevity are significantly increased if structures do not substantively shift, these structures do not have to be entirely static either. Structures may need to adjust according to the task at hand or the stage in institutional evolution. Networks relying on trust are common in the early stages of a watershed management effort while, over time, as tasks are defined and the network matures, more formal methods, sometimes in the form of second order organizations, are needed (Imperial & Koontz 2007).

It stands to reason that sustained governance structures are also better able to makes strides toward restoring the environment. The Chesapeake Bay and the Great Lakes have made progress toward their goals and have seen multiple on the ground success stories. Their ever increasing emphasis on an ecosystem wide approach and prioritizing necessary actions will likely increase their effectiveness in the future. Similarly the Platte and the Columbia Basin efforts are achieving goals of increased instream flow, though more work is needed to understand how these flows will affect the ecosystem. In contrast, during CALFED's lifetime the environmental health of the California Bay-Delta declined. The lack of even partially sustainable funding was a large factor in the inadequate governance of the California Bay-Delta initiative and its eventual downfall. Similarly, the Murray Darling market has been unsuccessful in producing intended environmental flows.

In addition to public funding, private funding has proven to be an important means for initiating watershed-scale coordination and for helping these watershed groups meet matching requirements. For example the Chesapeake Bay Trust was partially funded by private donations, which helped to establish the fund. The benefit of private funding is that it is funding that is dedicated to a specific project that cannot be diverted for other priority projects once donated. Private funding was also an important resource for the Great Lakes Restoration and Columbia River Basin. In the case of the Columbia River, voluntary donations were given by private corporations via water bills. These contributions can be significant, but the reliability of this type of funding may vary. Another critically important role for private funding has been providing support to collaborative restoration initiatives in the *early stages of formation*. Without private funding, many of the watershed partnerships currently working within the CRB would not have had the resources necessary for the establishment of a formalized structure, strategic planning, or capacity building.

In order for funding to be sustainable as defined above, it must be sufficient in reliability and magnitude to reach environmental goals. Though progress has been made toward such goals in many of the more successful case studies, it is difficult to gauge overall environmental impacts. In some cases, reaching set goals does not result in desired environmental outcomes. This makes the concept of financial sustainability in the context of ecosystem restoration and conservation cumbersome. A first step in addressing this difficult issue is to ensure that money spent is used as effectively as possible. This requires prioritizing work to ensure that the greatest environmental gains are made with the investment. The Chesapeake Bay and Great Lakes are shifting to this perspective and will hopefully see enhanced on-the-ground results.

Section 3: Watershed Case Study Lessons Learned

The following are lessons learned found in a review of pertinent literature - including a synthesis of findings from thirty-six 1990s studies examining success factors from watershed partnerships in the US, Australia, and Canada by the University of Colorado's Doug Kenney (2000). Lessons learned are also compiled from the large-scale watershed case studies conducted for the TC Sustainable Funding Report. For example, a lesson learned in the Platte River case study would be cited as *Tamarisk Coalition 2011 – Platte River*.

All of these lessons provide many insights into the successes and failures of watershed governance structures, primarily partnerships and associated structures. Where lessons learned contradicted one another *additional considerations* are offered based on information collected in the literature review.

OVERALL

Trust, funding, and time. Trust (Kenney 2000, Sabatier et al. 2000), funding, and time since inception are the most important predictors of success (Sabatier et al. 2000).

Effective governance structure. An effective governance structure, with clear leadership, that includes adequate and effective representation of federal, state, and local agencies, organizations, and stakeholders is essential in a large-scale collaborative effort (Tamarisk Coalition 2011 - Great Lakes, California Bay-Delta, Everglades, Working for Water, Murray-Darling, Columbia River Basin, National Estuary Program).

Partnerships equal power. Collaborative watershed partnerships can attract substantial resources (i.e. public funding and political support) (Imperial & Koontz 2007:2, EPA 1997).

Crisis triggers response. Crises catalyze policy making and partnership formation (Tamarisk Coalition 2011 - Chesapeake Bay, Puget Sound, Murray-Darling, Columbia River Basin). Further, a review of stakeholders' perception of success indicated that partnerships do a good job of addressing, and devote more time to, issues that stakeholders define as most serious (Sabatier et al. 2000).

SCOPE

Governance structure should correspond to project scope/scale. It is important to consider both the scope and scale of the project to best "encompass key physical factors and stakeholders groups" (Kenney 2000); as well as the correct management approach for the scale of the project (Tamarisk Coalition 2011 - Everglades, Murray-Darling).

Regional scope. Regional, multi-state partnerships create standards to encourage states to act, while allowing them flexibility in their approach (Tamarisk Coalition 2011 - Great Lakes, Chesapeake Bay). Stakeholders also perceive that their partnerships have been most effective at addressing problems that can be managed at a local or regional scale (Sabatier et al. 2000).

LEADERSHIP

Early/Large-scale Leadership

A champion. A champion of the cause, whether a politician or an organization, that works to push the program forward, is extremely important (Tamarisk Coalition 2011 - Chesapeake Bay, Great Lakes, California Bay-Delta, Everglades).

Sustained, Day to Day Leadership

Effective leadership. It has been shown that committed, effective leadership is very important in a watershed effort and to empower others (Kenney 2000, Tamarisk Coalition 2011 - California Bay-Delta, EPA 1997).

Coordinators and facilitators. While many feel that a coordinator is beneficial at a watershed scale (EPA 1997, Kenney 2000) the effectiveness of a facilitator is less understood.

Scales of Leadership

Local versus state or federal leadership. Some feel that successful partnerships provide leadership roles for local stakeholders (Kenney 2000). Other evidence shows that non-local leadership (i.e. state or federal leadership) is the key to successfully reaching agreements, implementing projects, conducting monitoring, and making true progress (Sabatier et al. 2000).

- **Additional consideration**: Appropriate Levels of Leadership. The Chesapeake Bay case study indicates that local leadership should be defined by decisions that are appropriate to make on a local scale, whereas decisions that will affect larger (i.e. regional) areas should be controlled by non-local leadership (Tamarisk Coalition 2011 - Chesapeake Bay)

Federal leadership needed in international restoration efforts. Federal leadership is appropriate and necessary in interstate and international interactions (Tamarisk Coalition 2011 - Puget Sound, Great Lakes, Chesapeake Bay, Platte River, EU Water Framework Directive).

Regional efforts in the US seeking guidance. Watershed wide, large-scale restoration efforts throughout the US are looking to one another for guidance, legal precedence, and funding mechanisms, perhaps indicating the need for increased national leadership. The Puget Sound is actively seeking increased national leadership in its partnership (Tamarisk Coalition 2011 - Platte River, Puget Sound, Chesapeake Bay, Everglades, Great Lakes, California Bay-Delta).

Informal Leadership

Providing a positive example and social pressure between states. In multi-state efforts more progressive states tend to lead the way for more conservative states (Tamarisk Coalition 2011 - EU Water Framework Directive, Chesapeake Bay, Columbia River Basin).

International examples and social pressure. International attention for a threatened ecosystem creates pressures on managers and politicians to act (Tamarisk Coalition 2011 - Everglades). Additionally, a shared international border provides additional pressure to proactively address resource challenges (Tamarisk Coalition 2011 - Great Lakes, Puget Sound, EU Water Framework Directive, Columbia River Basin).

Many Types of Leadership Needed

Many leaders needed. Multiple styles of leadership and participation are desirable (Kenney 2000).

PARTICIPATION/MEMBERSHIP

Appropriate representation. It is essential to make sure the appropriate stakeholders are involved, especially those with legal responsibilities and those who could block implementation and success (CNREP 2009). Ideologically diverse partnerships with a broad representation of local interests create high levels of trust and higher levels of agreement within the partnership (Sabatier et al. 2000; Tamarisk Coalition 2011 - Great Lakes, California Bay-Delta, Chesapeake Bay, Columbia River Basin). Diversified and inclusive membership of individuals and entities with varied? experiences must be balanced with the need for manageable numbers of clearly defined participants (Kenney 2000).

Balanced local, state, and federal participation. Many studies examined by Kenney emphasized the importance of governmental involvement at many levels, while cautioning about the danger of dominance or disparity in power among participants (2000).

Appropriate levels of participation. While it is important to involve many stakeholders for the reasons listed above, it is equally important to understand and to clearly articulate who the real decision makers are, and to be completely transparent in that process (Tamarisk Coalition 2011 - California Bay-Delta).

Longevity of participation. The importance of adequate time to attain results means that agencies or individuals need to sustain their participation over many months (Sabatier et al. 2000).

Participants' personality. Cooperative, enthusiastic and committed participants are needed to work through challenges collaboratively (Kenney 2000).

Participation affects legitimacy. Partnership participants impact the community's perception of its legitimacy. This perception can affect additional membership (Imperial & Koontz 2007:3).

AGENCY PARTICIPATION IN PARTNERSHIPS

Adequate agency support. Several studies examined by Kenney (2000) implied that adequate agency support and involvement is a key to success. Some examples promoted this involvement by altering agency processes and reward structures, potentially through legislation, to incentivize participation.

Partnerships are affected by agencies involved. It is important to consider the implications of the existing agency's or inter-organizational network's affiliation and history. It has been shown that agency affiliation or inter-organizational network past successes greatly impact a project's likelihood of success (Imperial & Koontz 2007, Bidwell 2006). For example, cumbersome federal process [primarily those of the US Army Corps of Engineers (USACE)], while noted to be improving, are partially blamed for slow progress in the Everglades (Tamarisk Coalition 2011 - Everglades).

Agency involvement according to the "polluters pay" principle. Federal and state governments created the dams and water projects that are affecting the health of the Platte River, the Columbia River Basin and the Everglades. Today these same agencies are responsible for funding the restoration of these systems, though funding levels have been lower to date for the Everglades than promised (Tamarisk Coalition 2011 - Everglades, Platte River, Columbia River Basin).

DECISION MAKING/DEGREE OF FORMALIZED STRUCTURE

Appropriate decision rules and processes. Many feel that it is important to create 1) official processes designed to facilitate communication, 2) clear rules that articulate the roles and responsibilities of participants, and 3) mechanisms for making and implementing decisions. However, the importance of maintaining flexibility and informality is also often cited (Kenney 2000, Tamarisk Coalition 2011 - California Bay-Delta).

- **Additional consideration: *Routinize change*.** Increasing the formalized structure of a partnership can increase its stability, longevity, and, hopefully, success. However, the stability can make it difficult for the organization to adapt to changing "political, social, economic, or watershed conditions" (Imperial 2004:15). This challenge can be overcome if the partnership is able to "routinize" change through structured channels, essentially institutionalizing adaptive management (Imperial and Koontz 2007:18).

COLLABORATION VERSUS REGULATION

Progress is generally either consensus or conflict oriented (Kenney 2000)**.** Either collaborative efforts to create change are able to move forward based on consensus based decisions with the support of all parties or one or more parties will find it necessary to resort to litigation to move an initiative forward.

Consensus based collaboration may poorly address contentious issues. Various studies examined by Kenney (2000) show both the value of consensus based decision making and the fact that it may poorly address contentious issues and may encourage lowest common denominator decisions.

Collaboration can weaken regulation. It is important to recognize the potential for collaborative efforts to weaken regulatory requirements or to reduce funding levels required to offset industry impact. This can occur as a result of participation by representatives of industries that are directly benefiting from and negatively affecting the resource in question (Tamarisk Coalition 2011 - California Bay-Delta, Platte River).

Collaboration should be backed by regulation of meta-governance. Collaboration on such a large scale is challenging to achieve and should be backed by regulation; otherwise, efforts would be so fragmented and vary so much with changing political agendas that progress would be difficult (Tamarisk Coalition 2011 - California Bay-Delta, Platte River, Murray-Darling).

Enforcement is difficult. Studies disagree on the correct mechanism for enforcement. Some show that formal and binding mechanisms are needed. Others show that advisory powers and moral authority is adequate (Kenney 2000). Case studies indicate that voluntary, collaborative efforts are not enough. Regulatory force is necessary for success (Tamarisk Coalition 2011 - Chesapeake Bay, Columbia River Basin), and collaborative efforts tend to be punctuated by periods of litigation due to a lack of or temporary stall in progress. This generally results in action that moves the collaborative program forward (Tamarisk Coalition 2011 - Chesapeake Bay, California Bay-Delta, Platte River).

Watchdogs can be helpful. It is helpful to have an independent watchdog serving to regulate actions (Tamarisk Coalition 2011 - Chesapeake Bay, Great Lakes).

STATUTE OF AUTHORITY/LEGISLATION

General

Statutes of authority encourage action. Embedding a large-scale, watershed restoration program in legislation, such as the CWA, provides government authorities, such as EPA, with a clear role and articulated responsibilities (Tamarisk Coalition 2011 - Chesapeake Bay, Great Lakes, National Estuary Program, Murray-Darling, Columbia River Basin, EU Water Framework Directive).

Statutes of authority encourage funding. If executive or legislative actions are enacted that hold a government body responsible for watershed wide restoration efforts and results, then it is more likely that there will be government funding available to increase progress toward goals (Tamarisk Coalition 2011 - Chesapeake Bay, Murray-Darling, Columbia River Basin, National Estuary Program, Great Lakes, Platte River).

Statutes of authority encourage markets. Without statutory authority natural resource markets are not likely to develop (Tamarisk Coalition 2011 - Columbia River Basin, Murray-Darling).

Existing partnerships are pushing for new legislation. Several large-scale, watershed restoration programs are trying to get new, more stringent legislation passed such as a strengthened CWA (Tamarisk Coalition 2011 - Chesapeake Bay, Puget Sound, Great Lakes).

Endangered Species Act

ESA can influence flow regimes. There is precedent for the ESA and watershed wide restoration activities to regulate water flows (Tamarisk Coalition 2011 - Platte River, Columbia River Basin, Everglades).

Lack of a Directed Statute of Authority

No riparian restoration related statute of authority. There is no statute of authority to directly fund riparian conservation related activities. Thus, a management plan containing an ecosystem/watershed wide approach is important and increases likelihood that riparian and

invasive species issues will be addressed (Tamarisk Coalition 2011 - Great Lakes, Chesapeake Bay, Everglades, Puget Sound, California Bay-Delta).

Creating new statutes – meta-governance involvement. A specific statute of authority can be created to facilitate and support a comprehensive environmental river basin management on a regional scale (Tamarisk Coalition 2011 - EU Water Framework Directive, Murray-Darling).

VALUES

Environmental, economic, and social values of the effort must be compatible. In order for the public to fully support and fund ecological restoration efforts they must understand how economic and social values will be met along with environmental goals (EPA 1997, Tamarisk Coalition 2011 - Working for Water).

Understanding and linking to public values. An accurate understanding of the public's opinion on an issue helps to garner political attention (Tamarisk Coalition 2011 - EU Water Framework Directive). In order to gain public support, you must appeal to the public's values. A major value of the public is *clean water and enough of it* (Hurd 2009/Tamarisk Coalition 2011 - Chesapeake Bay, EU Water Framework Directive, Great Lakes, Everglades, Working for Water, Murray-Darling). Human health, quality of life, economic development, irrigation, habitat, recreational opportunities are also significant public concerns related watershed health (Hurd 2009/Tamarisk Coalition 2011 - Great Lakes, Chesapeake Bay).

Diversity of participant values is important. Many studies show that partnerships should be composed of individuals holding similar social, economic, and environmental values, though other studies disagree (Kenney 2000). While it is more difficult and time intensive to include partners with diverse interests, a study has shown that ideological conflict aids in building social capital and may have positive impacts on agreements, restoration projects, and monitoring (Sabatier et al. 2000).

GOALS

Understanding the Problem

Shared, accurate understanding of the problem. The process should begin by stating the problem to be addressed and stating the goals that must be accomplished to solve it (CNREP 2009).

Setting Goals

Setting appropriate clear visions, goals, and action items. A single set of clear, specific goals, objectives, and guidelines are essential for an effective restoration plan (Kenney 2000; Tamarisk Coalition 2011 - Great Lakes, Chesapeake Bay, Platte River, Working for Water, Murray-Darling, Everglades).

Science based goals. It is critical that current science (often in the form of complex modeling systems) defines the system's problems and informs the solutions to those problems in a large-scale restoration project (Tamarisk Coalition 2011 - Chesapeake Bay, California Bay-Delta, Platte River, Puget Sound, Everglades, Working for Water, Murray-Darling, Columbia River Basin).

Appropriate Timeframe for those Goals

Adequate time. The complexity of watershed-scale issues requires a long-term perspective (Kenney 2000; Tamarisk Coalition 2011 - California Bay-Delta, Columbia River Basin).

Tiered goals. To address scope and timeframe issues, short-term goals (e.g. two years) and objectives that move incrementally towards long-term goals (e.g. 25+ years) are useful. They also help to insulate progress from shifting politics (Kenney 2000; Tamarisk Coalition 2011 - Chesapeake Bay, Puget Sound, Everglades, Columbia River Basin).

IMPLEMENTATION

Plans only succeed if implemented. (EPA 1997)

Adequate funding is required for implementation. Studies show that the need for stable and diversified funding to support administrative and project costs is ubiquitous (Kenney 2000, Tamarisk Coalition 2011).

Priorities must be clear. Program priorities and related expenditures must be clear for implementation to be efficient (Tamarisk Coalition 2011 - California Bay-Delta, Chesapeake Bay, Everglades).

Implementation actions must be directly linked to ecosystem improvement. Implementation actions must be directly linked to overall ecosystem improvement (Tamarisk Coalition 2011 - Puget Sound, Great Lakes).

TECHNICAL RESOURCES

Effective tools need to be available. (EPA 1997) It is important that there are known and good solutions to the problem being addressed (Tamarisk Coalition 2011 - Chesapeake Bay).

Adequate local resources and support. Adequate local resources and support for the partnership are necessary (Kenney 2000).

Adequate information sharing. Freely and regularly sharing information among participants and experts is said to be important, particularly scientific and technical information (Kenney 2000).

Collaboration training. Collaborative problem-solving training could be very valuable (Kenney 2000).

BUILD ON SMALL SUCCESSES

Successful demonstration project. A successful demonstration project in the watershed early on in the process can help to build support for the entire effort (Tamarisk Coalition 2011 - Chesapeake, Working for Water, Columbia River Basin).

A sub-group targeting a specific issue can be successful. A sub-group targeting a specific issue can be used to accelerate progress (Tamarisk Coalition 2011 - Great Lakes, Chesapeake Bay, Puget Sound, Working for Water).

EDUCATION AND PUBLIC RELATIONS

Education and involvement drive action. (EPA 1997)

Public support is necessary for success and for long-term funding. The program must actively seek consistent and widespread public support throughout its lifespan in order to 1) receive and maintain funding (Tamarisk Coalition 2011 - Chesapeake Bay), and 2) gain and maintain political support (Tamarisk Coalition 2011 - Great Lakes, California Bay-Delta, Everglades, EU Water Framework Directive, Murray-Darling).

Bi-partisan support is necessary. Bi-partisan support at both the public and political levels at an early stage is important to sustain support and funding for the program (Tamarisk Coalition 2011 - Chesapeake Bay, Great Lakes, Everglades, California Bay-Delta).

A public perception of crisis or urgency is important (i.e. the "why now?")**.** A public and political sentiment of an urgent need to progress toward a healthy, sustainable ecosystem is present in several of the case studies examined (Tamarisk Coalition 2011 - California Bay-Delta, Everglades, Chesapeake Bay, Great Lakes, Puget Sound, Murray-Darling). The laws of supply and demand are making the value of nature more apparent (Tamarisk Coalition 2011 - Puget Sound, Murray-Darling, Columbia River Basin).

MONITORING

It is important to measure, communicate, and account for progress (EPA 1997). Performance measures must be tied to program goals, clearly articulated, effectively monitored and reported, and the program must be held accountable for the achievement of these goals (Tamarisk Coalition 2011 – Chesapeake Bay, Great Lakes, Columbia River Basin, California Bay-Delta).

Monitoring is essential for long-term public support. An effective monitoring program is important, especially when there are long-term goals, to be able to show progress over time and to keep the public and politicians engaged (Tamarisk Coalition 2011 – Chesapeake Bay, Great Lakes, California Bay-Delta, Columbia River Basin). If monitoring shows there is no progress the public and political support may be in danger (Tamarisk Coalition 2011 - Everglades).

ADAPTIVE MANAGEMENT

Adaptive management is necessary but difficult. Adaptive management is an invaluable tool in large-scale restoration efforts (Tamarisk Coalition 2011 - Great Lakes, EU Water Framework Directive, Everglades, California Bay-Delta),

Adaptive management allows progress in the face of scientific uncertainty. If progress is to be made, large-scale restoration efforts must move forward in the face of scientific uncertainty. Adaptive management- the systematic process of continually improving management policies and practices by regularly reviewing outcomes- can help to identify and curtail any unintended negative impacts that may result from restoration practices(Tamarisk Coalition 2011 - Platte River, Everglades, EU Water Framework Directive).

Section 4: Contextual Considerations for the CRB

In order to make sense of the case studies and their lessons learned and apply them to the CRB, it is necessary to understand the context of the CRB. Contextual factors are especially important to consider when designating appropriate intergovernmental management strategies. A list of factors defined by Mark Imperial's 2004 document, *Intergovernmental Challenges of Watershed Management: Strategies for Improving Watershed Governance* are listed in the *Contextual Issue* column, and described in the *Considerations* column in Table 2 below. TC took these factors and applied to them to the CRB in the *Conditions/Recommendations* column. Thus Table 2 provides an overview of the conditions affecting the CRB. A firm understanding of these conditions will help determine the governance structure models that would be most successful for the CRB.

Table 2: CRB Contextual Assumptions

Contextual Issue	Considerations	CRB Conditions/Recommendations
Physical Setting	Size (as area increases so does network involved) political boundaries, and degree of isolation between regions within the project area (organizations isolated w/in the watershed may not share values and cultural norms, but isolation may also increase perceived interdependence and, thus, cooperation)	The CRB is very large geographically, diverse politically, and sparsely populated in many areas. This effectively isolates it both internally and as a whole when compared to the rest of the nation. The geographic and ecologic settings have historically been broken into the Upper and Lower Basins with political realities following suit These two areas are isolated from one another but share some camaraderie within their own boundaries. A successful CRB-wide initiative will require collaborations across the basin as a whole.
Configuration of Watershed Issues	1) The size of the network increases with the number and complexity of problems. 2) When problems are severe or approaching crisis, interagency support and cooperation is likely to increase. 3) New issues that have no clear, preexisting authority to restrict cooperation make organizations more willing to cooperate.	1) The CRB network is very large, 2) The water crisis in the CRB may aid interagency support on the flow issue, 3) climate change, the severity of the current water crisis and the tamarisk leaf beetle are all new issues with no clear or preexisting authorities to address them, thus they may aid in interagency cooperation.
Institutional Setting	The distribution of "functions, responsibilities, authorities, and resources" among network partners and the degree to which they interact (Imperial 2004: 23)	The institutional setting of the CRB is dynamic and involves numerous stakeholders and interest-groups to include federal, state and local governments and non-profit organizations. Most of the efforts to date in the CRB have been on a tributary –level. CRB tributary-level initiatives encompass smaller project areas, are directed and implemented by locally-based stakeholders, and work with much smaller budgets than the large-scale case studies presented in Appendix A. However, they do involve collaboration between multiple stakeholder groups, state, and federal agencies, they are influenced by local and regional politics and public perception, they struggle to establish sustainable funding streams, and they are attempting to address the same resources challenges associated with over-allocation of water. Further, tributary-level restoration partnerships offer something that the literature and external case studies cannot: real-time examples of collaborative watershed restoration within the CRB. They are small-scale functioning, evolving restoration initiatives

		currently underway, testing and modeling many of the "lessons learned" outlined in this report.
Situational History	Understanding the history of interactions among watershed members can reframe past issues and re-build trust.	The history of collaborative efforts throughout the CRB has not been fully documented to date. Any future effort to establish a CRB initiative should draft or chart a basic history of watershed interactions and identify past events that could negatively impact future cooperation.
Programmatic Context or "culture"	1) behavior norms, 2) level of common understanding of problems, policy solutions, & collaborative processes, 3) homogeneity of community preferences, 4) socio-economic conditions, 5) urban vs. rural settings, 6) political culture	The socio-economic and cultural landscape throughout the geographic area of the CRB has not been fully documented for the purposes of a CRB initiative. Any future initiative should inventory these characteristics throughout the CRB so as to ensure responsiveness to all stakeholders in the region.

The Human Element (Imperial 2004)

As the CRB moves forward, the following should be considered:

Trust and Relationship – Repeated, positive interactions over time are important to build *social capital*. Trust must be nurtured between existing partners and continually build with new members. It is slowly built and easily destroyed with negative experiences. Time and project effectiveness are key elements. So early on it may be good to avoid activities that have a high risk of failure or conflict.
Disposition and Skills of Participants – Participant disposition must be able to handle fulfilling, challenging, stressful, time-consuming, and laborious work, and be able to engage challenging individuals. Participants should have physical, biological, or environmental science backgrounds; strong interpersonal, political, leadership and persuasion skills.
Leadership – The following leadership styles are desired: entrepreneurs, coordinators, facilitators, fixer or brokers, devil's advocate, "unsnarlers", and champions.
Minimizing transaction costs – Effective coordination can minimize information costs, coordination costs, and strategic costs. High costs can make it less desirable to participate in the process.
Maintaining Accountability – There is a fine line between autonomy and accountability. Accountability is very important but too much monitoring coupled with strict enforcement may disincentivize participation. It is best to share credit/success /blame to avoid singling out organizations.

Section 5: Governance Structure Viability in the CRB

A summary of the TC's assessment of the four governance structure models as they are realized in the case studies is provided below. In addition, this section provides a summary of the TC's determination about the applicability of these models to the CRB. Table 3 provides an overall assessment of the viability of the four governance structure models for the CRB. For a detailed analysis of each case study see Appendix A.

Model 1: Inter-Organizational Network

Case Study

Large Federal Programs – Multiple Agencies - NAWCA and US Commission on Ocean Policy

Assessment

Pros:

- Partnering between federal and private entities.
- The role of the partners is well-defined.
- The funding mechanisms for this program are helping it meet its goals.
- High engagement in these projects by private foundations has increased success.

Cons:

- Implementation has been slow, especially the US Commission on Ocean Policy's recommendations.

Applicability to the CRB

A partnership between federal agencies and private agencies will likely be necessary for the CRB. However the CRB effort would also need to include a much broader scope of partners including the states and the public.

Case Study

Great Lakes Restoration

Assessment

Pros:

- Inclusion of the Great Lakes in federal legislation (CWA) has helped to ensure federal appropriations and political willingness.
- International, regional, local coordination has persisted over time and has accomplished many of its stated environmental goals.
- International collaboration has encouraged increased regulation in each country (e.g. strengthened CWA standards).
- Participation of federal agencies (e.g. EPA Great Lakes National Program Office) helps to ensure ongoing federal financial support.
- The Great Lakes Commission and Council of Great Lake Governors have helped to coordinate the restoration efforts of participating states and Canada and have ensured financial contributions by these entities.
- Province leadership has helped to coordinate restoration actions and encouraged an ecosystem-wide approach to restoring the Great Lakes.
- Non-governmental Organizations (NGOs) serve as a conduit for public or private funding.
- Wide –reaching engagement has allowed for increased participation.

Cons:

- Not all participating parties are pursuing an ecosystem wide approach.
- Funding levels are not adequate enough for ongoing implementation, which has delayed environmental outcomes.
- Reauthorization of the CWA could introduce changes to existing support for Great Lakes restoration.
- Unclear whether NGO resources are fully utilized.

Applicability to the CRB

- The international ecosystem-wide approach taken by the Great Lakes could be useful in the CRB.
- The specific federal agencies involved in a CRB effort would vary due to the nature of the issues, but the regional office approach could prove valuable as would the appropriation of funds for the purpose of CRB restoration.
- This case study provides a good example of how the seven CRB states could coordinate on a regional level; however the CRB would need to engage local and tribal interests as well.
- This case study provides a good example of adaptive management (i.e. the move to an ecosystem focus) can occur within a governance structure. This will be a very important aspect of CRB governance.
- The role of the private sector and other federal agencies provides a good example for the CRB.

Case Study

Columbia River Basin

Assessment

Pros:

- This informal network approach increased flexibility and allowed for information exchange and provided an alternative to a legal framework for water transfers.
- The CBWTP served to formalize the network and in so doing instituted innovative water market transactions.
- Partnering with the Central Oregon Irrigation District and BOR helped to restore flows to the river and implemented a "polluters pay" system.
- The Willamette Partnership is working to build efficient tools for market structures.

Cons:

- The lack of structure in this network makes it unclear what the ultimate goal of these markets is and how all these efforts are wrapping up to make meaningful environmental change. There does not appear to be a large-scale monitoring component.
- The demand for instream water transfers seems to still be largely fueled by federal regulation requirements and has not yet attracted a large amount of private demand.
- The link between water flow levels and expected environmental impacts is not clear.
- The network does not have set goals or a cohesive structure necessary for managing a water market.

Applicability to the CRB

- This informal network supported the creation of water markets in multiple sub-basins and tributary watersheds, which could translate well to support markets in any of the CRB tributary restoration.
- The informal network approach may encounter challenges in the CRB due to the need for specific and shared goals, especially if a similar water market were to be developed.
- Market systems in the CRB would require institutional shifts at many levels involving seven state governments, which require a firm public understanding of the specific ecologic targets and how the water market helped achieve them.
- The prioritization, accounting, and monitoring tools used in the Columbia provide a good example of a process that could work in the CRB.

Model 2: Second-Order Organization

Case Study

Chesapeake Bay Program

Assessment

Pros:

- Inclusion of the CBP in federal legislation has helped to ensure federal appropriations and political willingness.
- Federal and state engagement has increased the technical expertise and legitimacy of the CBP.
- CBP creates a forum for inter-state collaboration on policy and resource management.
- States autonomously implement CBP priorities.
- Allows for targeted implementation of project goals e.g. increasing the Blue Crab population.
- NGOs serve as a conduit for public or private funding.

Cons:

- Funding levels are not adequate enough for ongoing implementation, which has delayed environmental outcomes.
- Reauthorization of the CWA could introduce changes to the existing CBP construct.
- CBP does not have any true enforcement power.
- The overall planning effort could have been improved.
- Important to ensure that such groups buy into the goals of the collaborative to make sure these resources are effectively used.

Applicability to the CRB

- This case study provides a good example of how to engage multiple states and how to utilize numerous committees to get work done and make decisions.
- The role of the EPA in the CRB is likely to be less.
- Currently, the CRB is not supported by federal legislation and associated appropriations.
- This case study provides an example of an organization that has persisted over time, engaged public and private stakeholders, and successfully balanced state and agency autonomy and collective action.
- This case study illustrates how the absence of enforcement authority could become an issue in the CRB.
- This case study provides a good example of how the private sector contributes and how federal funds from agencies not directly involved can be put on the ground.

Case Study

EU Water Framework Directive

Assessment

Pros:

- Per the legislation each watershed is required to have a collaborative plan for recovery and potential funding mechanisms identified based on the true cost of water. This approach encourages the development of ecosystem wide goals and sets out techniques for addressing them.
- The EU provides support for the administrative costs which allows for ongoing collaboration.
- Participation by all affected member-states encourages shared responsibility for restoring and maintaining water resources.

Cons:

- Imposing requirements on numerous member-states with varying socio-economic conditions could result in non-compliance and could foster a sense of unfairness by poorer nations. The burden for funding restoration work could fall on the shoulders of the EU.
- The true cost of water system has not yet been tested and could fail.

Applicability to the CRB

- This case study provides an example of how legislation (in the case of the CRB it would need to be federal legislation) could address all water-related environmental health issues and incorporate the cost of implementation (including environmental costs) into the plan of action. Since this legislation doesn't currently exist for the CRB, any future legislation would need to assign and implement the "true cost" of water, including environmental costs.
- The WFD is essentially a much more comprehensive version of the CWA (e.g. including ecosystem components). As watershed restoration efforts become more common across the US, such a comprehensive framework of action could prove beneficial. High costs of water will necessitate considerations for agriculture and the poor which could include water subsidies or the water stamps used in Chile (similar to food stamps).
- The ability of the EU to create such overarching legislation to affect waterway health on such a large scale is also possible in the US. It will be interesting to see how successful these efforts are in generating large-scale progress towards clean water, fair allocation, and ecosystem health.
- It will be interesting to see how the various member states respond to this legislation. France has already been implementing it successfully for some time. The legislation's and EU's ability to handle uneven implementation of the directive would be useful in understanding how a similar multistate initiative in the Unites States might work.

Case Study

California-Bay Delta Program (CALFED)

Assessment

Pros:

- Although CALFED didn't persist, it created some momentum around conservation in the Bay and laid the ground work for science.
- State-engagement in CALFED helped to get the initiative started.
- Future plans associated with the Bay recovery effort (e.g. Delta Vision) could broaden the focus and increase the sustainability of the initiative.

Cons:

- CALFED experienced fragmentation, litigation, lack of clear leadership, and environmental decline due to its ineffective governance structure, which was characterized by a lack of leadership and an unclear decision making process.
- Reliance on public funding and balanced implementation reduced the environmental effectiveness of CALFED's work.
- The approach taken was not broad or inclusive enough for such a large ecosystem.
- CALFED was the result of a compromise to oversee federal and state work but because it did not have the necessary authority agencies resented the oversight.
- Existing agencies can experience challenges with new collaborative, multi-jurisdictional goals.
- Local governments were not adequately included in CALFED, decreasing trust in the organization.

Applicability to the CRB

- This case study demonstrates how a governance structure with inadequate leadership, poorly prioritized efforts and a dependence on state bonds can fail. The lesson learned is that leadership roles need to be clearly defined (especially between the state and federal governments) and local stakeholders need to be included, especially in the CRB.
- CALFEDs challenge was determining how to compromise between creating a "super agency" with enforcement power or a simple coordinating body. In the case of the CRB, one or the other would need to be realized.
- Another relevant aspect of this case study is the challenges associated with working through existing agencies that have their own objectives.
- The long-term plan Delta Vision could provide an example of impacts to water quality and quantity.

Model 3: Market Structures

Case Study

Murray-Darling

Assessment

Pros:

- The guiding plan will help define goals for the market.
- Public funds will be used to encourage the growth of this market and private interest is evident.

Cons:

- This model is not very inclusive as local stakeholders are not part of the process.
- To date, water market governance structure has not succeeded in producing more environmental flows.
- The market structure did not adequately capture the supply and demand aspects of the water market, and thus did not increase flows.

Applicability to the CRB

- This case study does not illustrate the level of inclusiveness known to be important in the CRB.
- Additionally, it has not been sufficiently designed to ensure that its environmental goals are met.
- While water markets could be employed in the CRB this might not be the best example as it has not been successful in moving towards environmental goals. Additionally, to gain proper buy-in, the goals of the instream water placement would likely need to be more inclusively created and more broadly advertised.

Model 4: Increased Capacity of Existing Organizations

Case Study

Large Federal Program – Single Agency

Pros and Cons

Pros:

- Established agencies have an advantage of established public trust and processes.

Cons:

- Standing affiliations of existing agencies could adversely affect new initiatives.

Applicability to the CRB

- Increasing, redirecting, or initiating new priorities for existing agencies could greatly improve CRB restoration capacity (i.e. funding streams and implementation capability). However, increased capacity alone will not likely address the level of collaboration needed in the CRB.
- Many of the agencies currently engaged in the CRB (e.g. BOR, USACE) have institutional mandates that would prevent them from adequately managing comprehensive restoration in the CRB.

Table 3: Governance Structure Viability in the Colorado River Basin

Governance Structure	Case Studies	Likelihood of success in the CRB
Model 1: Inter-Organizational Network	Large Federal Programs – Multiple Agencies - NAWCA and US Commission on Ocean Policy	**High**, as long as all stakeholders are involved.
	Great Lakes Restoration	**High**, if there is supporting federal legislation and funding and if federal agency involvement is mandated and is able to operate on a regional scale.
	Columbia River Basin	**High**, as long as clear collective goals are established and extensive public outreach is conducted to ensure a wide understanding of the need for a water market.
	Platte River	**High**, the composition of the committees, the role of the ESA and the demand for a water market are features that are directly relevant to the CRB
Model 2: Second-Order Organization	Chesapeake Bay Program (CBP)	**High**, because it provides a good example of a successful long-standing effort working across state lines. However, the role of federal involvement may vary in the CRB.
	EU Framework Directive	**Medium**, the existing federal legislation (ESA) that guides environmental standards in the CRB is not as wide-reaching as the Water Framework Directive, nor does it require the identification of funding mechanisms based on the "true-cost" of water for the implementation of restoration activities. However, this model could provide an example of how US federal legislation could be improved to better protect the CRB in the future.
	California-Bay Delta Program (CALFED)	**Low**, although CALFED provides many lesson-learned, the model of an organization with poorly structured leadership would not likely increase success in the CRB.
Model 3: Market Structures	Murray-Darling	**Low**, the absence of an inclusive process would not complement the needs of the CRB.
Model 4: Building Capacity within an Existing Agency	Large Federal Program – Single Agency	**Medium**, increased capacity of existing agencies will be a necessary component of a CRB model, but not suffice on its own.

Section 6 - General Conclusions and Recommended Next Steps

Collaboration on watershed issues is currently taking place throughout the CRB on different scales, yet to date there has not been a formal effort to collaborate throughout the entire watershed. A number of stakeholder collaborations are working at local and regional levels within the CRB. More specifically, several tributary-level watershed restoration partnerships have been established within the CRB, some of which have survived the initial stages of formation and are actively implementing restoration work on the ground, while others are still in the early stages of formation (See Appendix B). Each of these groups is autonomous, and the manner in which they inter-relate is informal. Currently, there is no structure to enable collaborative benefits at a basinwide scale (Carpe Diem West, 2011). Thus the current management system is not adequately addressing all Colorado River conservation and restoration needs, and current funding is insufficient. To address these issues a CRB-wide initiative may need to be established.

The case studies examined in this study explore different models of watershed collaboration that are taking place in river systems throughout the world. A review of these case studies provides examples of approaches that may or may not work within the CRB. Overall these case studies indicate an expected trend - that a well-designed, effective governance structure is tied to successful funding mechanisms. Of particular importance seem to be: 1) an adequate meta-governance role and financial support; and 2) an adequate inclusion of stakeholders, including local and private groups. In all of the US watershed initiative case studies examined, the meta-governance statutes were the driving factor for the initiatives that created a regional governance structure. In the US federal case studies, the Murray-Darling, and the European Water Framework Directive, the governance structure was written into new, meta-governance legislation.

Substantial and well executed meta-governance that supports the goals and needs of a given governance structure is essential to its ultimate success. Bell and Quiggin (2008) argue that it is within the meta-governance that much of the "heavy lifting" will need to occur in order to enact substantial watershed management change, at least in Australia's Murray-Darling watershed. As a result, in order to create effective governance structures to address complex, landscape scale human and environmental issues there is a need to research meta-governance and state capacity when considering effective governance structure (Bell & Quiggin 2008:727). With adequate meta-governance in place, watershed groups have the necessary authority to achieve their environmental goals and gain legitimacy. In addition meta-governance can facilitate a certain level of guaranteed funding. A more inclusive process that engages a wider pool of stakeholders also helps to gain legitimacy and helps to diversify the pool of available funding.

A summary of each of the four broad governance structure categories are discussed below in regards to their 1) applicability to the CRB, 2) potential for CRB buy-in, and 3) potential funding options.

Model 1. Inter-organizational Network

Applicability to the CRB –The current situation in the CRB is seen as excluding many stakeholders (i.e. NGOs and the public) (CNREP 2011); involves varying levels of trust among its participants; and does not have enough funding to address all of the CRB's issues. Thus, if change is desired, a method to fill the governance gap is necessary.

One option is to simply increase the structure and formality of the CRB inter-organizational network in such a way that the current gaps are closed. Such a network would need to be more inclusive, increase levels of trust, and thus increase likelihood of attaining adequate funding from the public and private sector to reach CRB goals. This could be accomplished in a variety of ways. For example, inter-organizational working groups and task forces could be created, a watershed plan could be created, and priorities and policies set. These plans and policies can be formalized in a Memorandum of Understanding, an accepted watershed management plan, or by being incorporated into individual agency rules committees. Including the right set of stakeholders for such an effort would be absolutely critical from the beginning. It may be difficult for a clear leader to emerge from such a network to effectively drive the program forward.

Other options include creating a second-order organization, market structure, or both, within the existing network or a more formalized network. A second-order organization could serve many of the functions of a more formalized network (i.e. creating goals and shared vision) while market systems seem to be less adept at creating such overarching understandings of purpose. For this reason, a market system could benefit from operating within a more formalized framework.

Potential for Buy-In – As previously mentioned, the current CRB network has a widespread buy-in challenge. Many organizations and stakeholders feel excluded from the current structure, and few conceptualize that such governance could occur at the basinwide scale (CNREP 2011). Formalizing the network and working to build trust within it (a hallmark of network systems) could go a long way toward increasing stakeholder buy-in and basinwide collaboration.

Potential Funding Options – All of the case studies examined include some form of network structure. As a result a myriad of funding options exist. As discussed in the *Characteristics of Success* section, properly engaging all stakeholders in a broad network, from government to private sector, would create the most robust funding portfolio. However, this requires that stakeholders buy into the process and trust its ability to succeed, suggesting a fairly structured network.

Model 2. Second-order Organization

Applicability to the CRB - A pattern apparent in the case studies shows that the informal, consolatory stages of networks are consistently replaced with those that have more regulatory and legal backing. As Imperial (2004) states, those early, informal interactions can "provide a forum for building relationships and trust" (p. 9) and can build "collaborative inertia" (p. 15). However, if more formal structure is needed, eventually a second-order organization is formed, generally in the form of a leader within a larger network. This is valuable, as a tangible entity is created that the public can identify as responsible for the collective good of the CRB. It can be an appropriate forum for deciding upon

collective goals and for agreeing on collective priorities for action. Such steps greatly increase the effectiveness of restoration on such a large scale. A second-order organization need not replace the current, or a more formalized version, of the interagency network. Rather, a second-order organization could work within the current interagency network to target certain needs.

Potential for Buy-in – Second-order organizations, under effective leadership and with proper inclusion of stakeholders, have potential to gain high levels of public and political buy-in. Many responsibilities come with public buy-in, including the need to 1) effectively use funds via prioritization schemes and 2) monitor and report project impacts on a regular basis.

Potential Funding Options – A second-order organization provides goals and priorities, *and* has more enforcement power and/or influence to accomplish those goals. This structure enables state and local agencies to create innovative funding structures to implement these programs. This allows the restoration initiative to access a wider range of funding sources that are appropriate for various locations and local political climates.

Model 3. Market-based Structure

Applicability to the CRB - An essential portion of a CRB restoration initiative would require that sustainable water use be maintained for human consumption, enterprise (i.e. hydropower, irrigated agriculture, and municipal and industrial uses), and the water needs of our declining ecosystems. According to Aylward (2009) such sustainability is accomplished in two ways: 1) by increasing the economic efficiency of water allocation in the market - by better enabling water to move from low-value to higher value uses - and, 2) by improving the physical efficiency of water use through new technology. An efficient water market that legitimizes the ecosystem as a *value* and allows water gains from efficiency improvements to be returned as instream flows is essential to the sustainability of the CRB. A failure of current water market governance (Aylward 2009) implies that it is necessary to elevate or prioritize the value of environmental needs within water markets.

Such an assertion supports the creation of a market system in the watershed, which can exist within an inter-organizational network, a second order organization, or both. However, it is unlikely that a market system would effectively close the governance gap in the CRB on its own, as neither of the two market based case studies examined (the Columbia River Basin and the Murray Darling Basin) effectively did so outside the context of a network or partnership. Ideally, a supporting network would use market-based funding mechanisms to work toward specific conservation or restoration goals. Such goal setting is one of the most ubiquitously mentioned lessons learned from the partnership case studies. It is essential to set and communicate goals to gain public and political buy-in, and thus the demand necessary to drive markets.

Potential for Buy-in – While regulatory drivers may work in the CRB, good-will based incentive programs would be more challenging to enact in the arid southwest. As water is considered a critical resource in the CRB, it is likely that a larger effort would be needed to explain to the public and to the private sector what instream water or ecosystem service purchases would accomplish. This could be accomplished by an overarching network or second-order organization effort such as that demonstrated by the Deschutes River Conservancy. In the Columbia River Basin a network of markets is responding to a regulatory driver; the desire to avoid legislative action created the necessary buy-in to create this market. Currently, demand is largely driven by private organizations subject to ESA requirements or through public funds. Several of these markets are now trying to broaden private buy-in through programs such as a corporate certificate programs to show that the purchaser is environmentally responsible.

Potential Funding Options – Driving public and private demand for instream water or the benefits provided by intact ecosystems is a tricky task that can be accomplished through 1) regulation, and/or 2) significant public support or buy-in. In the short term it is likely that public or private investment funds will be needed to start up a market that must be carefully crafted to persist overtime. Given the failure of the two market systems examined, the Murray Darling and the Columbia River Basin, to create sustainable water markets, these two market systems may be better thought of as roadmaps for assigning value to water and governing its distribution, than as sustainable sources of restoration funding.

Model 4. Building Capacity in Pre-Existing Organization or Agency

Applicability to the CRB and Potential for Buy-in – It is likely that building capacity within existing agencies and organizations to address a collaborative path forward would be an integral part of a CRB initiative. Effectively involving and enabling these agencies in goal setting will be very important to gain their buy-in, political support, and available funds. This could occur in a network or second-order organizational setting and would help to secure any additional funds these agencies could contribute to the effort.

Potential Funding Options – Existing agencies and organizations operate numerous programs in the CRB that could be re-directed by a more holistic view of the watershed. Again, buy-in and participation in the initiative would be critical to achieve this shift.

Meta-governance

Applicability to the CRB – Some are concerned that collaborative governance structures are capable of weakening federal environmental legislation by shifting decision power to participants and away from strict, federal agency standards (Echeverria 2001, Aiken 1989). Thus, adequate legislation enforcing actions to protect human and environmental health are an important part of laying the groundwork for a CRB initiative. The EPA is experienced in watershed-scale restoration initiatives but does not have much of a presence in the CRB. The BOR does not specialize in watershed restoration, but is a more regionally based candidate and has worked with several initiatives such as the Platte River and the California Bay-Delta Program.

Potential for Buy-in – The federal government is not always welcome in regional affairs, and this seems to be true of the current political climate in the southwest. Involving regionally based federal agencies may make this necessity more palatable. A technical advisory function for less locally involved agencies, such as the EPA, would be likely be more acceptable than a more central role.

Potential Funding Options – Meta-governance participation has the potential to support a successful governance structure for a CRB restoration initiative, both financially and programmatically. A specific funding mechanism could be put in place to reliably fund some portion of a CRB program or governance structure. At the least, adequately involving meta-governance would aid the use of agency funds to support a CRB initiative.

Moving Toward a Basinwide Restoration Initiative for the CRB

In sum, the findings of this study in relation to the CRB indicate that a combination of different aspects of all of the four governance structure models would likely prove successful as long as adequate meta-governance is in place. As this document demonstrates, there are myriad methods for constructing a governance structure that would support a CRB restoration initiative and establish the funding mechanisms required for sustainability. What it also shows is that there are important steps to take, and issues to consider, when crafting any one, or any combination, of these structures. A CRB-wide initiative should build the following components into its process:

- Trust, Funding, and Time.
- An Effective Governance Structure.
- Adequate Power to Drive Action.
- A Recognized Problem (a crisis helps)
- Appropriate Scope
- Effective Leadership
- Appropriate Participation/Membership
- Properly Aligned Environmental, Economic & Social Values
- Clear and Specific Goals
- Effective Implementation
- Adequate Regulation
- Adequate Authority
- Adequate Technical Resources
- Adequate Monitoring
- Adaptive Management
- Demonstration Projects
- Adequate Public Education and Relations
- Effective and Agreed Upon Decision Making

The study also demonstrates some of the pitfalls that should be avoided, such as poor leadership, a strong dependence on bonds, unclear environmental goals, lenience in federal standards, and the lack of an inclusive process.

The first step towards establishing a CRB initiative would be to establish the necessary level of meta-governance and identify all of the existing efforts underway throughout the CRB. The second step would be to determine which combination of the four governance structure models should be pursued given the goals, funding levels and capacity of existing efforts.

These “first steps” would be further supported by:

- Conducting a follow-up study that inventories the existing CRB partners (e.g. federal, state, local, tribal, non-profit, researchers, private, etc…) that could be involved in a basinwide initiative and charting their functions, responsibilities, authorities, and resources.
- Charting a basic history of watershed interactions in the CRB, identifying past events that could negatively impact future cooperation and creating action plans to address such difficulties.
- Compiling a description of the geographic distribution of socio-economic conditions and cultures that could impact or be impacted by a CRB level initiative and formulating action plans to address them.

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Appendix A: Governance Structure Case Studies

Unless otherwise noted, all the information below is summarized from The Tamarisk Coalition 2010 Sustainable Funding Report titled: *Sustainable Funding Options for a Comprehensive Riparian Restoration Initiative in the Colorado River Basin*.

Report available at: **www.TamariskCoalition.org**

Eight case studies are included in Appendix A (A-1 through A-8). These case studies were selected for their category of governance structure, applicable lessons learned, and/or geographic proximity to the Colorado River Basin. These case studies, coupled with a broader literature review, provide the basis for our analysis of governance structure. They are provided here as a resource for the reader, to be referenced throughout the body of this report.

Section A-1, the first case study, summarizes the structures and funding mechanisms of a collection of federal agency programs.

The remaining Sections (A-2 through A-8) feature individual case studies. Each case study analysis includes:

- a general *Governance Structure Summary*, accompanied by a table of baseline information (Table 1);
- a program timeline (Table 2) outlining the evolution of each governance structure over time;
- a *Funding Summary*, accompanied by a table of funding mechanisms and supporting information (Table 3); and
- commentary on *Suggested Applicability to the Colorado River Basin*.

About Table 2: Why a Timeline?

Although the course of each case study has been shaped by a distinct set of variables, constraints, and advantages, commonalities emerge from their timelines. While these commonalities are summarized in the body of this report as "lessons learned" (Section 3), the individual case study timelines provide unique insights into the characteristics of watershed-level response to regulatory catalysts, the variables that prompt successive transitions to more formalized governance structures, and the timeframe required for each stage of multi-state, multi-organization, and in some cases multi-national collaboration at the watershed scale. Watershed-scale collaboration on complex conservation challenges can take decades (in some cases over a quarter of a century) to yield results, or conversely to be dismantled. The *evolution* of a governance structure supporting a watershed-level conservation initiative, when distilled into a timeline, outlines the ebb and flow of program momentum over the years, as influenced by funding availability, political climate, litigation, public perception, level of stakeholder inclusion, and the success or failure to achieve conservation goals and milestones.

About Table 3: Funding Significance and Reliability

In the body of this report **sustainable funding** is defined as **a revenue stream that is sufficient in magnitude to accomplish a program's goals and reliable enough to support long-term maintenance and monitoring programs**.

The third table shown in the case study analyses of Appendix A uses two criteria to assess the sustainability of each of the funding mechanisms employed by the various entities that comprise the watershed collaboration: *significance* and *reliability*. Significance denotes whether or not a given funding mechanism would create a sufficient magnitude of funding to play a large role in reaching the goals of the program or a portion of the program. Reliability denotes whether or not a specific funding mechanism is likely to be viable into the future. The scale used for determining the level of these two factors is "high", "moderate", or "low".

Appendix A-1: Federal Case Studies

Model 4. Building Capacity in a Pre-Existing Organization or Agency and Model 1. Inter-Organizational Network (federal-private partnership)

Governance Structure Summary:

Several existing government agencies have raised conservation funds through single federal tax or fee mechanisms that apply to resource users who benefit from conservation spending. In general, the governance structure of programs motivated by policies aimed at improving resources but without adequate resources to do so can be described as **building capacity in a pre-existing organization or agency (Model 4)**. The agency is also responsible for the administration and distribution of the funds collected. Such programs tend to address targeted issues, such as wildlife species or infrastructure maintenance issues. This is true of the following federal case studies: Pittman-Robertson Act, Dingell-Jonson Sport Fish Restoration Act, Migratory Bird Conservation Act of 1929 and Migratory Bird Hunting Stamp Act of 1934, Conservation and Reinvestment Act (CARA), Harbor Maintenance Trust Fund, The Domenici-Landrieu Gulf of Mexico Energy Security Act of 2006, and The Highway Trust Fund.

In contrast, where current policies do not sufficiently address conservation issues, such as complex ecological system protection and restoration, new government structures are created to find solutions and to administer new funds. This is true of the following federal case studies: 1) the North American Wetlands Conservation Act (NAWCA) of 1989 which is governed by a **federal-private partnership (Model 1)** and 2) the US Commission on Ocean Policy where a governance structure is not yet defined but will likely take the form of a collaborative.

Table A-1.1 provides a summary of the primary Federal Case Study governance structures and their funding sources.

Table A-1.1: Summary of Federal Case Study Governance Structure & Funding Sources

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
Pittman-Robertson Act 1937				
Model 4. Added Capacity to the US Fish and Wildlife Service (FWS)	Supports projects to restore, conserve, manage, and enhance wild birds and mammals and their habitat. Also supports public use and access to wildlife resources, hunter education, and development of shooting ranges. Successful.	Ad Valorem tax on hunting equipment. Funds are held in a trust fund (Wildlife Restoration Account) and are distributed to the states as grants.	Moderate	High
Dingell-Johnson Sport Fish Restoration Act of 1950				
Model 4. Added Capacity to the US Fish and Wildlife Service (FWS)	This Act is patterned directly after the Pittman-Robertson Act to improve fisheries by funding state fish and wildlife agencies. Successful.	Ad Valorem tax on fishing gear and associated products. Funds are held in a trust fund (Aquatic Resources Trust Fund) and are distributed to the states as grants.	Moderate	High
Migratory Bird Conservation Act of 1929 and Migratory Bird Hunting Stamp Act of 1934				
Model 4. Added Capacity to the US Fish and Wildlife Service (FWS)	These Acts in combination authorized the Secretary of Interior to acquire land "for use as inviolate sanctuaries for migratory birds." Lands purchased are protected in the US Fish and Wildlife Service's National Wildlife Refuge System. Successful.	Duck Stamps sales. Funds are held in a special Treasury account known as the Migratory Bird Conservation Fund and used by the US Fish and Wildlife Service (USFWS) to buy land.	Moderate	High
Harbor Maintenance Trust Fund (HMTF)				
Model 4. Added Capacity to the US Army Corps of Engineers ()	The fund supports harbor maintenance such as dredging. The fund has resulted in a surplus but the U.S. Army Corps (USACE) of Engineers reported that most harbors are under-maintained since the surplus is spent for general government purposes and has not yet been protected. Success is	Funded by the Harbor Maintenance Tax (Ad Valorem tax) at 0.125% of cargo value or cruise ship passage tickets. Funds are deposited into the Harbor Maintenance Trust Fund from which Congress appropriates funds for harbor O&M purposes, principally	High	Low

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
	limited by appropriations.	through the Army Corps of Engineers.		
The Domenici-Landrieu Gulf of Mexico Energy Security Act of 2006				
Model 4. Added Capacity to the Dept. of Interior and TX, LA, and MS	This legislation made it possible to conduct conservation related activities in the Gulf States and all 50 states in accordance with the Land and Water Conservation Fund Act. Successful.	Redistribute Outer Continent Shelf oil and gas royalties Revenues were collected by the Dept. of the Interior and redistributed to the states covered by the Act: TX, LA, and MS.	High	High
The Highway Trust Fund				
Model 4. Added Capacity to the Dept. of Transportation and state transportation departments	Created by the Highway Revenue Act of 1956, it is primarily to ensure a dependable source of financing for the National System of Interstate and Defense Highways and also as the source of funding for the remainder of the Federal-Aid Highway Program. Successful.	Motor vehicle and motor fuel related taxes. The trust fund administered by the Department of Transportation provides funding to state transportation departments for the existing transportation systems.	High	High
Conservation and Reinvestment Act (CARA)				
Model 4. Unknown: The legislation failed to pass	Although not passed by congress, CARA would have made conservation funds available to communities throughout the nation. Not enacted.	Was to dedicate a portion of federal offshore oil and natural gas leases to conservation programs.	High	High
North American Wetlands Conservation Act of 1989				
Model 1. Public-private partnership	The USFWS, North American Wetlands Conservation Council (appointed by Secretary of Interior, includes state wildlife agencies, non-profits, the National Fish and Wildlife Foundation, and the USFWS) are the primary partnership actors. This act supports the funding and implementation of the North American	Appropriations	Varies	Low
		Fines, penalties, and forfeitures (Migratory Bird Treaty Act of 1918); federal fuel excise taxes on small gasoline engines; and interest accrued on the fund (Pittman-Robertson Act of 1937). Funds are distributed by the FWS via grants through the NAWMP	Moderate	High

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
	Waterfowl Management Plan (NAWMP). Successful.	program.		
US Commission on Ocean Policy				
Model 1. Current governance was deemed lacking. Envisioned more coordination on all levels of government, decisions based on science, and an informed and engaged public.	A presidential commission of 16 members created to examine current ocean management policy. The commission found that American's ocean policy is not successful in protecting these vital resources and that responsibilities were dispersed among federal, state, and local agencies. Level of success is yet to be determined.	Revenues from off-shore oil and gas royalties and from "new uses of offshore waters." (If it had been enacted, likely	Moderate	High

Funding Summary:

At this point in time, the NAWCA is the only active partnership and has the most diverse funding stream. It is also the only federal case study examined that receives appropriations.

Suggested Applicability to the Colorado River Basin:

Several of the funding mechanisms examined in The Nature Conservancy's (TNC, 2011) and Tamarisk Coalition's 2010 sustainable funding reports are similar to the new, altered, or redirected federal tax mechanisms discussed above . Dedicated trust funds or treasury accounts that do not rely on appropriations have greatly increased the success of such funding mechanisms in achieving their goals.

The federal programs addressing complex, dispersed environmental issues are the ones in need of increased capacity. Restoring the CRB will involve addressing many similar complexities involving numerous environmental issues and spanning many agencies.

While many existing agencies must coordinate to achieve success on a CRB scale, it will also be necessary to seize opportunities to build capacity within existing agencies and organizations. In order to ensure that such capacity will further a CRB initiative, these agencies must be involved in the larger governance structure that will collectively determine goals and priorities for the watershed.

Appendix A-2: Chesapeake Bay Program

Model 2. Second-Order Organization (federal/multi-state/private governmental partnership with local support)

Governance Structure Summary:

Table A-2.1 provides an overview of the watershed's location, the stakeholders and governmental agencies engaged in the process and the legal framework influencing the Chesapeake Bay Program.

Table A-2.1: Chesapeake Bay General Information

Location/Jurisdiction	Virginia, Pennsylvania, Maryland, District of Columbia and - to a lesser extent - West Virginia, Delaware, New York
Original Citizen Proponents	Fishermen, Sailors, Waterfowl Hunters
Original Legislative Champion	Senator Charles Mac Mathias (R-Md.), a devoted sailor and fisherman
Underlying Drivers of Degradation	Population Growth, Water Quality Degradation
Statutory Authority	• Clean Water Act • Chesapeake Bay Agreements of 1983, 1987, 2000 • Executive Order 13508
Legal and Policy Considerations	Riparian water doctrine

In the 1970s Chesapeake Bay area residents began to notice a precipitous decline in the health of the Bay. In response, the Environmental Protection Agency (EPA) conducted a congressionally directed five-year study to analyze the Bay's health in late 1975. The results indicated that the health of the river was in peril and created the Chesapeake Bay Commission (CBC) to begin addressing these issues. The CBC is composed of governors from Maryland, Virginia, Pennsylvania, congressmen, and the Mayor of Washington D.C. Following a conference to review the outcomes of the EPA-led study in 1983, the Chesapeake Bay Agreement was created, effectively prioritizing the Bay's health on a national scale and creating the Chesapeake Bay Program (CBP). The CBP was authorized in Section 117 of the Clean Water Act (CWA) and is a partnership among MD, VA, and PA and with the federal government, largely represented by the EPA. In 1987 the renewed Chesapeake Bay was described as "general spirit of cooperation and coordination" to specific goal-oriented programs with measurable targets and timeframes (Doyle & Miralles-Wilhelm 2008:182). Although these goals were set to be accomplished by 2000 they were not achieved. Consequently, the Chesapeake 2000 Agreement (C2K) was reached to identify goals that could be reached by 2010.

The governance structure facilitating the ecological restoration of the Chesapeake Bay is largely a top-down approach, but one that accommodates significant grassroots involvement. The CBP receives significant support from various resource-specific state programs, large environmental non-profit organizations and community or sub-watershed level non-profit organizations. The statutory authority driving the restoration work in the Chesapeake Bay is the CWA. Thus, the EPA is a prominent member of the partnership, but does not act as the governing entity. The governance structure of the CBP can be thought of as a **federal/multi-state/private governmental partnership with local support (Model 2).**

The CBP strikes a balance between an informal inter-agency network and a more formalized second-order organization with enforcement power. This can be seen in the CBP's following statement: "Although all agreements are entered into voluntarily, they may result in mandatory action" (CBP 2010). These voluntary agreements are signed by state governors, the Chesapeake Bay Commission, and the EPA as a representative of the entire federal government (CBP 2010).

Consensus has been the guiding principle for policy making in the CPB, which has helped prevent most litigation. However, the CPB has seen some litigation (e.g a lawsuit in October 2008 filed by the Chesapeake Bay Foundation against the EPA) and increases in regulation and accountability (e.g.2009's Executive Order).

The progress of C2K has been slower than expected in achieving environmental results due to a lack of regulatory force and funding. President Obama's Executive Order 13508 in 2009 sought to address these issues by providing more federal funding through appropriations and by granting the EPA more enforcement power in the region. Thus, while the agenda is CBP-driven, ultimate enforcement lies with the signing states and the EPA. Although not perfect, as enforcement power has been found lacking, this process seems to walk the line between state and agency autonomy and collective action very effectively.

The CBP organizational chart is illustrated in Figure A.2-1 and displays how the programs was structured into government committees, citizen committees and academic or technical committees to inform the decision-makers of the Executive Council of the CBP.

Figure A.2- 1: The Chesapeake Bay Program Organizational Chart (CBP 2011)

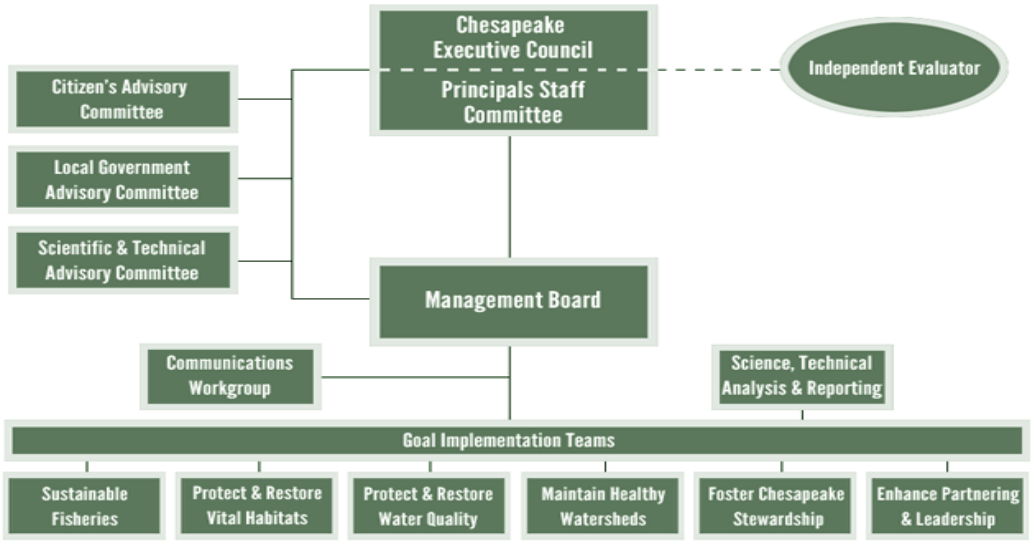

Table A-2.2 provides a chronological representation of the milestone events that make up the history of the CBP.

Table A-2.2: Chesapeake Bay Program Summary and Timeline

Timeline	Chesapeake Bay Initiative	Description/Purpose
Late 1975	Initial, Momentum Generating EPA Study	Conducted by the EPA following Mathias's leadership, Congress directed the EPA to conduct a $27 million, five-year study to analyze the rapid loss of wildlife and aquatic life in the Chesapeake Bay
1980 (MD & VA), 1985 (PA joined)	Chesapeake Bay Commission (CBC)	A policy development organization (composed of Congressmen, Governors from MD, VA, PA, Mayor of DC) created to recommend changes in management to increase cooperation
1983	Chesapeake Bay Conference & Chesapeake Bay Agreement of 1983	CBC-sponsored conference to review the original 7-year EPA study, resulting in (1) a congressional prioritization of the Bay- the 1st Chesapeake Bay Agreement, and (2) creation of the Chesapeake Bay Program
1983	Chesapeake Bay Program (CBP)	Created by the 1983 Agreement and authorized by Section 117 of the CWA its first task was to study the bay's health and determine environmental quality management improvement. The CBP has 50 subcommittees and is essentially a partnership among the VA, MD, and PA and between them and the federal government, represented by the EPA. • CBP Chesapeake Executive Council - Cooperative governing entity of the CBP composed of MD, VA and PA Governors, Chair of CBC, EPA Director, and Mayor of DC. Establishes policy direction for the CBP: Its Principals Staff Committee provides policy advice to the Executive Council, sets agendas for annual meetings, and directs the Implementation Committee, the Executive Council and its committees. • Implementation Committee- Composed of representatives from the signatories, 10 federal agencies, and other program participants (U of M & VT), this committee implements the decisions and technical studies of the Executive Council and coordinates activities carried out under agreements.
1984 reconstituted in 2010	CBP Scientific and Technical Advisory Committee (STAC)	Composed of experts from state, federal, universities, research institutions, and private industry (based more on institutional affiliation than expertise) the group provides scientific and technical advice through reports and position papers, reviews of Bay Program initiatives, and annual conferences and workshops. Members serve on CBP subcommittees and workgroups and provide liaison between the scientific/engineering committee and the Bay Program.

Timeline	Chesapeake Bay Initiative	Description/Purpose
Unknown	Chesapeake Research Consortium (CRC)	Provides support staff to STAC and other CBP subcommittees. Association of six institutions to work w/ policy makers to design and carry out multidisciplinary studies to find solutions to problems affecting the bay.
1987	Chesapeake Bay Agreement of 1987	Moved from the "general spirit of cooperation and coordination" to specific goal-oriented programs with measurable targets and timeframes (Doyle & Miralles-Wilhelm 2008:182). The agreement addressed water quality, habitat, population growth, development, public information, education and participation, public access, and governance. First time measurable water quality goals were set.
1996to July 2003	Bi-State Blue Crab Advisory Committee (BBCAC)	Created by MD & VA to provide specific focus on overharvesting of the blue crab and to give independent advice to the 3 regional management jurisdictions. The Committee helped to integrate science in the process and was largely successful. Successfully involved political leadership at high levels in MD and VA so that no one seriously opposed their recommendations. It was disbanded due to lack of funding and slowing interstate collaboration.
2000	Chesapeake 2000 Agreement (C2K)	Goals from the 1987 agreement were not reached by 2000 so 300 scientists, resource managers, policy makers, and citizens, worked for 3 years to create C2K. Nearly 100 restoration commitments are made in this document, organized into five main goals: 1) water quality protection and restoration, 2) living resource protection and restoration, 3) vital habitat protection and restoration, 4) sound land use, 5) stewardship and community engagement. The timeframe for achievement of these goals was set for 2010. The creation of specific goals and timetables in the Agreement of 1987 and Chesapeake 2000 has allowed for relatively streamlined collaboration and action on the ground. Main problems – no regulatory force and no funding
2003	Chesapeake Bay Watershed Blue Ribbon Finance Panel (CBWBRFP)	Responsible for identifying innovative funding sources to remove the Bay CWA's impaired waters list by 2010. The Panel's recommendation was to create a regional Finance Authority with large investments by federal and state governments, but did not identify sources for these funds.
2009	Executive Order 13508	Provides more money for the EPA and more enforcement power. Created a Federal Leadership Committee to oversee agency efforts to restore the Bay including the following requirements by September 9, 2009: 1) EPA - define steps necessary to restore water quality in the Bay; 2) USDA - target agricultural conservation practices that will better protect the Bay and its rivers; 3) Department of Defense - strengthen storm water

Timeline	Chesapeake Bay Initiative	Description/Purpose
		management practices; 4) DOI and Department of Commerce - must assess and plan for climate change on the Bay and expand research, monitoring and observation to strength science based decision making; and 5) DOI - expand public access to the Bay and its rivers. These reports were integrated by the Federal Leadership Committee into a coordinated Bay restoration strategy by May 12, 2010. This strategy created rigorous regulations to restore clean water and oyster populations and to conserve agricultural and undeveloped lands. It also increased regulation and accountability by requiring federal agencies to establish and meet two year milestones towards Chesapeake Bay goals.

Funding Summary:

The states participating in the implementation of the CBP receive some congressional appropriation funding. However, this contribution is not very significant in terms of CBP implementation needs. Appropriations for administrative operations, particularly those to the regional EPA office, are important to the CBP's success and are guaranteed by Section 117 of the CWA.

The majority of the CBP's funds are supplied by the Bay states, with the greatest contributions made by Maryland. The discrepancy between Maryland's substantial contributions and those of the other Bay states highlights the proportional contribution (free rider) problem that exists under a management program largely driven by state interest. Such a framework is susceptible to political or ideological differences between states. However, state autonomy may also allow for greater socio-political acceptance of the restoration effort as a whole. Additionally, it makes sense that Maryland would be more willing to pay the costs of restoring the Bay since its miles of coastline have the most to gain. Maryland is also rewarded for its active approach to Chesapeake Bay restoration by gaining the lion's share of the federal funds supporting the CBP.

Maryland is also is a source of leadership that serves as a model for the other states and for other watersheds. For example, no single trust fund exists for the Bay restoration effort, as was suggested by the Chesapeake Bay Watershed Blue Ribbon Finance Panel in 2003. However, the State of Maryland has instituted the Chesapeake Bay Trust, which funds restoration work in Maryland. This state-sponsored trust fund is managed independently of the larger CBP and operates as a self-funded non-profit entity. The other watershed states (VA, PA, NY, DE), which see less direct benefits from Bay restoration, do not have an equivalent state trust fund established.

One of the main concerns of the C2K is the absence of a dedicated, sustainable funding source that will allow it to capable of reaching its goals. In lieu of a sustainable funding source, C2K is working to prioritize restoration actions so as to ensure that the money available is being used in the most effective manner possible.

Combined Summary:

Table A-2.3 below provides a summary of the primary governance structures in the Chesapeake Bay, their funding sources, and how these approaches might apply to the CRB.

Table A-2.3: Summary of Chesapeake Bay Restoration Governance Structure & Funding Sources

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
OVERALL – Chesapeake Bay Program				
Model 2. Federal/Multi-State/Private Partnership w/ Local Support	Second-order organization/Network- Partnership between 3 states, the federal government, and NGOs Statute of Authority - the CWA, collaborative agreements, and agencies involved. CBP slowly increasing its authority.	Federal/Multi- State/Private Partnership w/ Local Support	Moderate	Moderate
		Congressional appropriations to distribute for state implementation	Low	Low
Federal Leadership/ Management – Chesapeake Bay Program				
Model 4. Existing Agencies	Increased Capacity in Existing Organizations - Largely Regional EPA office, participates in CBP activities (e.g. EPA led study as directed by congress); Federal Leadership committee Statute of Authority – CWA; Regional EPA Office created in Section 117 of CWA; Executive Order 13508.	Appropriations (for management)	Moderate	Moderate
		Executive Order backed appropriations	Moderate	Low
State Leadership – Chesapeake Bay Commission				
Model 2. Multi-State Commission	Second-order organization - Brought MD, VA, PA, D.C. leadership in 1980	Various sources related to state budgets	Unknown	Unknown
		Dedicated Funds	Moderate	High
		General Funds (e.g.VA, PA, D.C.)	Low	Low

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
State Implementation -Maryland[1]				
Model 4. Existing Agencies	Increased Capacity in Existing Organizations -MD is responsible for implementing CBP Agreements' requirements in MD. As a progressive state with a traditionally heavy tax burden and powerful governor, MD has implemented several mechanisms to create *special* state funds dedicated to conservation that could aid the efforts of the CBP and several newer funds dedicated directly to the Chesapeake Bay.	Bay Restoration Fund: municipal wastewater fee	Moderate	High
		Maryland Land Conservation Fund (1969): real estate transfer fees funding land conservation – currently being raided but there is pressure to protect this fund and use it for its original purpose	Moderate	Low
		Conservation Reserve Enhancement: used Farm Bill's Commodity Credit Corporation (CCC) to rest & rehabilitate land	Moderate	Low
		The Chesapeake & Atlantic Coastal Bays 2010 Trust Fund (2007): generated by rental car and motor fuel tax, raided in 2008 due to lack of legislative security	Moderate	Low
		Chesapeake Bay Trust (1985): a state government created non-profit - specialty license plates, state tax form donations, private contributions, and interest create the fund which is insulated from the state budget and dedicated to the CRB.	Low	High

[1] NOTE: Maryland's funding sources were more extensively researched than those of VA, PA, NY, and D.C. and so the comparable wealth of funding mechanisms may be misleading.

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
State Implementation - VA				
Model 4. Existing Agencies	Increased Capacity in Existing Organizations - VA is responsible for implementing CBP Agreements' requirements in VA. As a conservative state with a traditionally low tax burden and relatively less powerful governor, VA has few funds available to fulfill CBP Agreement obligations.	Water Quality Improvement Fund (1997): state appropriation funds dedicated to the Chesapeake Bay	Moderate	Low
State Implementation - NY				
Model 4. Existing Agencies	Increased Capacity in Existing Organizations - The state is further removed from the Bay and thus less invested in restoration efforts. Statute of Authority - NY is responsible for implementing CBP Agreements' requirements in NY.	New York State Industrial Finance Program: provides tax exempt and taxable conduit loans to private entities and then uses the profits to make low interest loans for environmental facilities	Unknown	Unknown
State Implementation - PA				
Model 4.Existing Agencies	Increased Capacity in Existing Organizations - The state is further removed from the Bay and thus less invested in restoration efforts. Statute of Authority - PA is responsible for implementing CBP Agreements' requirements in PA.	Growing Greener II (2005): an act to grow the green economy funded by waste and pollution fee expansions, will potentially provide environmental bond funding	Moderate	High

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
Targeted Issue – Bi-state Blue Crab Advisory Committee				
Model 4. Existing Agencies	Increased Capacity in Existing Organizations - The state is further removed from the Bay and thus less invested in restoration efforts. Statute of Authority - PA is responsible for implementing CBP Agreements' requirements in PA.	Growing Greener II (2005): an act to grow the green economy funded by waste and pollution fee expansions, will potentially provide environmental bond funding	Moderate	High
Non-profit Foundation Support				
Model 4. Existing Agencies (Increased Capacity in Existing Organizations)	1. Campbell Foundation for the Environment: noting the lack of sustainable funding in the Chesapeake, the Foundation seeks to build capacity for partnerships supporting environmental change	Grants funds to build capacity for stronger, scientifically based environmental action resulting in informed management of the Chesapeake	Unknown	Unknown
	2. National Fish and Wildlife Foundation: Supports the Chesapeake Bay Stewardship Fund to strategically catalyze innovative, sustainable, & cost effective conservation actions to restore the Chesapeake	Grants funds through the Chesapeake Bay Small Watershed Grant Program and the Innovative Nutrient and Sediment Reduction Program supplied by EPA, US Forest Service, and National Oceanic and Atmospheric Administration (NOAA)	Unknown	Unknown
	3. Chesapeake Bay Funders Network (CBFN): A funding collaborative, co-chaired by the Chesapeake Bay Trust and Keith Campbell Foundation for the Environment, supporting training programs to build capacity in watershed organizations to improve efficiency	Creates opportunities for funders to pool resources and exchange information to increase the protection and restoration of the Chesapeake Bay	Unknown	Unknown

Suggested Applicability to the Colorado River Basin:

Many socio-political differences exist between the Chesapeake watershed and the CRB that must be considered when comparing the feasibility or applicability of management and governance schemes. Additionally, the main environmental issues facing the two watersheds differ significantly. The major problem in the Chesapeake Bay is water quality, with major CWA implications, while the CRB is focused largely on water quantity, which is largely governed by a regional compact amongst the seven basin states.

Despite these differences, the collaborative process that has allowed the Chesapeake to determine common goals and set priorities to reach watershed health could be a useful model for the CRB. The collaborative nature of these efforts have allowed for the pooling of resources to conduct science, support implementation, and promote public and political understanding of, and backing for, the issues at hand.

The CBP has also successfully maintained momentum for nearly 30 years, engaged public and private stakeholders at all levels in the process, maintained funding (though not enough to accomplish goals), adaptively managed using new knowledge (i.e. learned to better prioritize actions), and seems to walk the line between state and agency autonomy and collective action very nicely. These are no small tasks and the CBP should be viewed as a very useful model for the CRB.

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Appendix A-3: Great Lakes Restoration

Model 1. Inter-Organizational Network (Bi-national Collaboration Network led by an International Commission)

Governance Structure Summary:

Table A-3.1 provides an overview of the watershed location, participating stakeholders and governmental agencies, and the overarching legal framework of the Great Lakes Restoration program.

Table A-3.1: Great Lakes Restoration- General Information

Location/Jurisdiction	8 US States (Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, Wisconsin), and two Canadian Provinces (Ontario, Quebec*) bordering the 5 Great Lakes – Superior, Michigan, Huron, Erie and Ontario. Nearly 40 Tribal Nations, more than half a dozen major metropolitan areas, and numerous county and local governments.
Non-Governmental Stakeholders	Agricultural and urban water users, environmental groups, fisheries groups, industry: steel/manufacturing
Government Agencies Involved	National: EPA, USACE, NRCS, NOAA, Agency for Toxic Substances and Disease Registry, USFWS, National Parks Service (NPS) Regional: Great Lakes Governors, Great Lakes Cities
Underlying Drivers of Degradation	Toxic pollution, nutrient pollution, invasive species, habitat degradation: Agricultural chemicals, elevated soil runoff, urban waste, industrial discharge, disposal site leachate, and atmospheric deposition on the lake's large surface areas, exacerbated by low outflow rates.
Statutory Authority	• Primary Fed Authority (Canada): Environment Canada • Primary Fed Authority (US): EPA • Great Lakes Interagency Task Force (IATF)- cabinet-level federal body • State-level (US): Council of Great Lakes Governors
Major Legislation	US-Canada Boundary Waters Agreement, Great Lakes Water Quality Agreement, Clean Water Act, Executive Order 13340 *Great Lakes Interagency Task Force*

***** While not a part of the Great Lakes Basin, Quebec's position along the Saint Lawrence Seaway makes it a partner in water resource management with Ontario and the eight US states.

The Great Lakes- St Lawrence System is the largest fresh water system on earth, containing one-fifth of the world's surface fresh water. The system of governance and management for restoration on the Great Lakes can be described as a complex, **bi-national collaboration network led by an International Commission (Model 1)** and composed of multiple layers of US and Canadian governmental authorities and secondary organizations (federal, state, and provincial agencies). This network is responsible for the implementation of a series of trans-boundary treaties and agreements developed over the past century**.** The **International Joint Commission (IJC)**, also known as the Great Lakes Basin Authority, is a second-order organization created to lead the collaborative management of Great Lakes under the 1909 Boundary Waters Treaty. Subject to no government authority, the IJC is unable to implement policies or projects. Thus, it serves primarily as a *watchdog* by settling disputes, monitoring, and reporting on the progress of the two federal governments toward restoration goals and implementation of water quality and pollution abatement measures. As second layer of oversight, the IJC receives guidance and assistance from more than 20 advisory boards.

> The International Joint Commission is one of the oldest international basin commissions that has effectively and peacefully managed the transboundary waters of two nations (for over) 100 years…Over the past years the Commission has skillfully used public opinion to exert indirect pressure on the Governments to comply with their obligations by making use of its discretionary power to publish reports, documents, and other statements (Leb 2010).

In 1977 the first landscape scale, international approach to restoration was initiated with the Great Lakes Water Quality Agreement (GLWQA). This legislation committed to specific goals and guidelines for restoration of the Great Lakes Basin ecosystem. The GLWQA was amended in 1987 to require Remedial Action Plans (RAP) for prioritized Areas of Concern (AoC). States and provinces are responsible for creating and implementing the RAPs required by this legislation. The result is a *grassroots environmental democracy* that empowers the public within the Great Lakes region. Federal assistance with restoration plans is available on request and progress is monitored in terms of individual projects and overall success (EPA, Great Lakes Areas 2008).

In the US, the EPA is the primary federal agency responsible for helping to fund and implement environmental restoration and management activities on the Great Lakes to comply with the GLWQA. As additional support, Section 118 of the CWA (1977) created a Great Lakes National Program Office (GLNPO), which was EPA's first regionally based office. In 1995, the eight states and the EPA created the Great Lakes Final Water Quality Guidance, or the Great Lakes Initiative, a comprehensive restoration plan (EPA, Great Lakes Initiative 2010). When passed, it was considered, "EPA's first attempt to address water quality on a regional, basinwide basis, it paves the way for similar efforts for the Gulf of Mexico and other water bodies" (Renner 1995:416A).

In 2004 the EPA established a cabinet-level task force, the Great Lakes Regional Collaboration, to further increase collaboration. In 2010, yet another effort, the Great Lakes Restoration Initiative (GLRI) was created to build on the work of the task force and the collaboration. This initiative will use outcome-oriented performance goals and measures to target the most significant problems in the region, including invasive aquatic species, non-point source pollution, and contaminated sediment.

In Canada, the federal department Environment Canada (EC) leads the Canada Federal Great Lakes Program (the Program), initiated in 1989. The EC thus has the primary responsibility to work with 8 other Canadian federal agencies, as well as provincial governments, to restore Great Lakes ecosystems. As the leader of the Program, the EC cooperates with the US through the GLWQA and with Canadian provinces through the Canada-Ontario Agreement. The Program required the creation of a Great Lakes Action Plan that is generally renewed every five years to protect the water quality and ecosystem health of the Great Lakes (EC, Canadian 2010).

In both the US and Canada additional, more specific agreements have been concluded by **state and provincial level governments**, amongst each other and with the federal governments. Primary examples include treaties limiting water diversion, negotiated by the **Council of Great Lakes Governors** (US), and the oft-revised **Canada-Ontario Agreement on the Great Lakes Ecosystem**, which has been expanded to address land use, habitat protection and restoration, emissions and human health research.

Progress:

Despite all of this work and collaboration, the 2009 State of the Great Lakes report showed that the health of the Great Lakes still varied; some aspects of the ecosystem were improving while others had declined. There were no clear success stories in the Great Lakes' recovery (EPA, Great Lakes, State 2010). These unclear results occurred in spite of the relative success several programs have had in meeting goals. For example 40 of the IATF's 48 near-term actions to restore the Great Lakes were successfully completed. In addition, the US federal share of one third (200,000 acres) of protected/restored wetlands goal was met in 2008.

The IJC cites the lack of a comprehensive watershed management approach in the current agreement as the main cause of this slow progress. The International Union for Conservation of Nature's (ICUN) SHARE Toolkit Case Study analysis of the Great Lakes Initiative points out that while initially innovative, management and legal frameworks for the GLWQA now lag behind recent science and trends in management structure (Leb 2010). Indeed, the Great Lakes program does not seem to have a clear adaptive management goal. The IATF may be addressing this issue as it is striving to proactively respond to emerging issues for which there may not be effective existing programs (GLIATF 2009).

Table A-2.2 outlines 100 years of major conservation initiatives, within the US and Canada, and also jointly between the two nations. The Great Lakes Restoration Timeline is slightly more complex than timelines of some other Governance Case Studies featured in this document. Bi-national milestones (initiatives formally involving both nations) are highlighted in yellow.

Table A-3.2: Great Lakes Restoration Program Timeline

Date	Great Lakes Conservation Initiative/Milestone	Description/Implications
1909	US-Canada Boundary Waters Treaty (Boundary Waters Agreement)	Initial framework for cooperation between the US and Canada on Great Lakes water quality and quantity. Laid the legal foundation for, and established, the **IJC or "Great Lakes Basin Authority"**- an independent body, funded but not supervised by the 2 federal governments.
1955	Great Lakes Compact (US)	8 US States bordering the Great Lakes form the **Great Lakes Commission.** Beginning of state coordination.
1972 (renewed 1978)	**Great Lakes Water Quality Agreement**	First basinwide international approach to restoration this legislation committed to specific goals and guidelines for restoration of the Great Lakes Basin ecosystem.
1977	Creation of the Great Lakes National Program Office (US)	EPA's first regionally based office. Created under Section 118 of the CWA to more effectively handle EPA's responsibilities associated with GLWQA. Responsible for coordinating US federal activities with all other stakeholders including three EPA Regions, the eight lake states, Canadian provinces and nations, US Tribes, counties, and municipalities (EPA, The Great Lakes National 2009).
1983	Council of Great Lakes Governors (US)	Formed by the governors of the 8 US States involved in the Great Lakes Compact, to protect water resources and hold economic status within the nation.
1987	Amendment to GLWQA	Increased accountability through required biannual reports, timelines, and strengthening practices and technologies. Included: • State and Province-run **Remedial Action Plans** for **Areas of Concern (AoCs)**, transferring responsibility and management to states and/or provinces, creating localized environmental democracies. • **Lakewide Management Plans (LAMPs)** to coordinate the work of governmental, tribal, non-governmental and public entities on each lake.
1989	Canadian Federal Great Lakes Program/Great Lakes Action Plan (Canada)	Led by EC, the Program is essentially a partnership bringing together six Canadian federal departments and one federal agency. This Program leads cooperation with the US through the GLWQA and with Canadian provinces through the Canada-Ontario Agreement described below. The associated Action Plan is generally renewed every five years to protect the water quality and ecosystem health of the Great Lakes. (EC, Canadian 2010).
1994	State of the Lakes Ecosystem	Jointly initiated by US and Canada as a biennial forum for measuring success and reviewing

Date	Great Lakes Conservation Initiative/Milestone	Description/Implications
	Conference (SOLEC)	progress and conditions.
1995	Great Lakes Final Water Quality Guidance (US)	The final version of a comprehensive plan to provide criteria to guide states in setting water quality standards for 29 pollutants. States must provide Guidance Submissions to the EPA for approval.
1997	Great Lakes Binational Toxics Strategy	This Strategy created a framework for Environment Canada (EC) and the USEPA to coordinate with one another, and their respective constituents, to prioritized persistent toxic substances to be eliminated (Leb 2010).
2004	Great Lakes Interagency Task Force (IATF) (US)	A cabinet-level federal body created by President George W. Bush's Executive Order 13340 to improve federal coordination for cleaner Great Lakes water, sustainable fisheries and to target measurable results. The IATF, the Council of Great Lakes Governors, Great Lakes Cities Initiative, GL Congressional Task Force and Native American Tribes were tasked with creating a framework document for a Great Lakes Regional Collaboration (GLRC). Also established a Regional Working Group (RWG), and created "Key Strategy Recommendations" with 48 near term actions of which 40 have been completed and almost all the rest are on track. Also proactive on new, emerging issues.
2005	IATF created Great Lakes Regional Collaboration Strategy to Restore and Protect the Great Lakes (US)	EPA, Departments of State, Interior, Agriculture, Commerce, Housing and Urban Development, Transportation, Homeland Security, the Army, Health and Human Services, Council on Environmental Quality. A wide-ranging, cooperative effort to design and implement a strategy for the restoration, protection and sustainable use of the Great Lakes.
2007	Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem	Originally created to coordinate federal and provincial implementation of the GLWQA the agreement has since moved beyond pollution control to focus on an ecosystem approach to restoring the lakes by targeting land use, habitat protection and restoration, emissions, and human health research (Leb 2010; EC, Canada-Ontario 2010).
2010	Great Lakes Restoration Initiative (GLRI) (US)	Governed by an Executive Committee with reps from Fed, states, cities, tribes, and congress. Builds on 5 years of IATF work & Great Lakes regional collaboration strategy. Will use outcome-oriented performance goals and measures to target the most significant problems in the region including invasive aquatic species, non-point source pollution, and contaminated sediment. Long-term goals: safe to eat fish, swim, drink water, & healthy ecosystem for fish & wildlife. Helps IATF carry out the Great Lakes portion of the US Ocean Action Plan.

Funding Summary:

The costs of enacting conservation initiatives in the Great Lakes are shared by federal, state, and local governments in both the US and Canada. The US and Canadian governments employ a range of funding mechanisms to support their part in the restoration effort. These include federally-appropriated and state-appropriated funds, which both require matching funds. These funds are provided by state general fund-supported bonds, the creation of multi-state endowments, private foundation grants, a revolving loan fund for the purchase of coastal and freshwater sites of high ecological significance, and conservation easements by non-profit land trusts and public agencies. Some of the more innovative funding mechanisms are summarized below.

In the US: Currently, EPA grants based on congressionally approved funds are focusing on the most significant Great lakes ecosystem problems such as: Toxic Substances and Areas of Concern, Invasive Species, Near shore Health and nonpoint Source Pollution, Habitat and Wildlife Protection and Restoration, and Accountability, Education, Monitoring, Evaluation, Communication and Partnerships.

Other funding is made available through the Great Lakes Legacy Act of 2002 (renewed in 2004) who appropriations went to the implementation of action plans in the 31 designated AoC within the US territory. So far, 900,000 cubic yards of sediment have been removed and five projects have been largely completed at a federal cost of $53 million, which leveraged $44 million non-federal dollars (EPA, Great Lakes Legacy 2009).

States: The Great Lakes Protection Fund is a private, non-profit corporation that was formed in 1989 by the Governors of the Great Lakes states to be a permanent source of financial support to restore the lakes. The fund also supports projects working to create ecological wealth in the Great Lakes region though market mechanisms. Seven of the eight Great Lakes states provided a one-time contribution to capitalize the Fund's permanent endowment at $81 million. This endowment is then invested to produce income, two-thirds of which is dedicated to regional Great Lakes projects. The remaining third of the earnings are distributed annually to the member states in proportion to their original contribution to support their Great Lakes related responsibilities. The fund has no matching requirements (GLPF 2003).

In Canada: EC administers the Great Lakes Sustainability Fund (GLSF), renewed until at least 2015, which provides up to one-third of total costs of municipal remedial water quality projects in designated Areas of Concern.

Table A-3.3 provides a summary and assessment of the primary sources of funding in the Great Lakes Basin and their funding sources.

Table A-3.3: Summary of Great Lakes Restoration Governance Structure & Funding Sources

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
OVERALL – Canada, US, State, Provincial, Local, and Non-Governmental Organizations				
Model 2. Bi-national Collaboration Network led by an International Commission	Network led by Second-order Organization - A network of agencies in Canada and the US led by an independent, watchdog commission Statute of Authority - 1909 US-Canada Boundary Waters Treaty, 1987 GLQWA, 1997 Great Lakes Bi-national Toxics Strategy	Combination of federally and state-appropriated funding requiring project matching	Moderate	Low
		State general fund-supported bonds	Moderate	Low
		Creation of multi-state endowments	Moderate	High
		Private foundation grants	Moderate	Moderate
Federal Agencies, US				
Model 4. Existing Agency led Network	Increased Capacity in Existing Agency (EPA) to lead Network – Created a regional EPA office through the CWA to lead Great Lakes Restoration Initiative defined Network Statute of Authority – 1987 GLQWA, 2010 Great Lakes Restoration Initiative	Great Lakes Legacy Act (2002): US Congress/EPA federal appropriations, 35% state/local match required. 2004: $270 million authorized over 5 years.	Moderate	Low
		Legislation Required Clean Water Act funds: to EPA Great Lakes Office. $475 million program budget in 2010	Moderate	High
Federal Agencies, Canada -Canadian Federal Great Lakes Program				
Model 1. Existing Agency led Partnership	Partnership Network of Existing agencies - Created in 1989, led by EC, the Program leads cooperation with the US & Provinces Statute of Authority - 1987 GLWQA, Canada-Ontario Agreement	Great Lakes Sustainability Fund (2000) Environment Canada. 2000: $30 million authorized over 5 years. 2/3 match required from municipalities.	Moderate	Moderate
States – Great Lakes Commission & Council of Great Lakes Governors				
Model 2. Second-order Organizations	Network led by 2 second-order organizations – coordinate the restoration	Great Lakes Protection Fund: private, non-profit created by 7 of the Great Lakes States.	Moderate	High

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
leading Network	& conservation efforts 8 states in the Great Lakes region Statute of Authority – 1955 Great Lakes Compact, 1987 GLWQA	One-time contributions created a permanent endowment of $81 million. 2/3 of annual interest invested in regional Great Lakes projects, 1/3 back to states		
		Michigan: "Clean Michigan Initiative" 1998 voter approved $675 million bond.	Moderate	Low
Provinces – Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem				
Model 1. Network	Agreement strengthened Network - created in 2007 to coordinate federal and provincial implementation, has since moved beyond pollution control to focus on an ecosystem approach to restoring the lakes Statute of Authority - 2007 Canada-Ontario Agreement, 1987 GLWQA	Unknown		
Non-Governmental Organizations				
Model 4. Existing Agency	Increase Capacity in Existing Non-profit – Congress created, National Fish and Wildlife Foundation (NFWF) *Sustain Our Great Lakes Program*	Public conservation funds matched with private contributions. Provides grants to projects in all 8 states and both provinces	Unknown	Unknown
Healing Our Waters (HOW) Great Lakes Coalition				
Model 2. Second-order Organization	New organization - Launched in 2004 with a $5 million grant from the Wege Foundation. Multi-organization Coalition	Seeks to sustain funding through collaboration, lobbying and policy work.	Unknown	Unknown
Foundation				
Model 4. Existing Agency	Existing Foundation creating new fund - Charles Stewart Mott Foundation created The Conservation Fund, Great Lakes Revolving Loan Fund	$7.3 million grant, available for direct loans to land trusts and advance purchase of land on behalf of public agencies and/or nonprofits (The Conservation Fund 2011).	Moderate	Unknown

Suggested Applicability to the Colorado River Basin:

The CRB and the Great Lakes region both experience a demand for water that exceeds supply, the presence of several ESA-listed species, and a growing concern about invasive species. Otherwise, the two ecosystems are quite disparate. Nevertheless, the Great Lakes Restoration project provides two very important lessons that can be applied to the CRB.

First, as a bi-national watershed-level initiative, the Great Lakes Restoration Program provides valuable insights into successfully working across national boundaries to restore an ecosystem. Canada and Mexico are two very different countries but CRB conservation interactions between the US and Mexico can still be informed by the successful partnerships built in the Great Lakes region. For example, the all of the efforts moving toward restoration in this area are driven by the GLQWA between the US and Canada. The CWA has been strengthened in this region as a result of the international efforts (i.e. creating a regional EPA office and maintaining rigorous standards). Similarly, the US has obligations to provide Mexico with a certain quantity and quality of water through the Mexican Water Treaty of 1994 (NRCS 2010). This treaty serves as an additional safeguard on the health of the Colorado River and should be a large consideration in a theoretical CRB restoration initiative.

Second, it is imperative that both governance structures chosen and any action plans written must be able to evolve over time. When the Great Lakes restoration network first began it was on the cutting edge. Now its lack of a comprehensive watershed management approach under the current agreement is cited by the IJC as cause for its slow environmental progress (Leb 2010). Environmental progress in the Great Lakes has been slower than expected in several areas despite several programs making great strides to meet their short-term goals (accomplishing 40 out of 48 IJC approved near-term actions). This could be a result of poorly defined, weak, or improperly prioritized goals due to the lack of a landscape scale, ecosystem approach. In any case, this program could benefit from re-assessment and re-alignment of goals and procedures through the process of adaptive management. Canada's 2007 Canada-Ontario Agreement Respecting the Great Lakes Basin Ecosystem is beginning to address this issue by taking an ecosystem approach to enforcing the GLWQA in the provinces. It is not clear whether there is an adequate mechanism for this in the US.

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Appendix A-4: European Union Water Framework Directive

Model 2. Second-Order Organization (International Partnership Mandated Network of Member State Organizations and Agencies)

Governance Structure Summary:

Table A-4.1 provides an overview of the watershed location, participating stakeholders and governmental agencies, and the applicable legal framework influencing the European Union Water Framework Directive.

Table A-4.1: EU Water Framework Directive General Information

Location/Jurisdiction	European Union
Original Citizen Proponents	General population (as tracked by the European Commission's Eurobarometer) Demanding – "Clean water and enough of it"
Original Legislative Champion	European citizens
Underlying Drivers of Degradation	Water Quality Degradation: Ground Water Salinization, Reduced Flows, and Diffuse Pollution caused largely by Agriculture
Statutory Authority	Water Framework Directive
Legal and Policy Considerations	The Principle of Sustainable Growth and the Precautionary Principle

The 1972 UN Conference on the Human Environment in Stockholm marked the beginning of comprehensive environmental protection policy in Europe. At this conference the European Economic Community, a precursor to the European Union (EU), noted that Europe's environmental health was critical to its economic viability and called for a plan of action to sustain it. In 1986, the Single European Act created a framework to construct environmental policy. In 1992 the Maastricht Treaty elaborated on environmental policy structure by adopting the *principle of sustainable growth* and the *precautionary principle*. The Treaty also established the European Union (Leb 2010).

Over time, the EU has worked to coordinate fragmented and reactionary regulations to create landscape scale, integrated management policies with a preventative focus. In water policy, this shift towards integration was manifested in the European Water Framework Directive (WFD) which was initiated in 1995 (Leb 2010). Adopted in 2000, the WFD repealed seven old directives, effectively streamlining European water policy (EC, Environment 2010).

The key aims of the WFD are to 1) expand the scope of water protection to all surface and ground water, 2) achieve good status for all waters by a set deadline, 3) conduct water management actions based on river basin boundaries, 4) combine the approach to emission limit values and

quality standards, 5) establish prices that account for the true cost of water, 6) ensure citizen participation and education, and 7) streamline legislation (EC, Environment 2010).

Methods for attaining results are left up to the EU member states, but the directive must be transposed into the national law of each EU member state. Each member state must also assign an entity responsible for coordinating efforts to implement WFD required actions (Leb 2010). As the European Union can be thought of as an immense, international partnership (Europa, Basic Information 2011), the overall governance structure of the WFD can be thought of as an **International Partnership Mandated Network of Member State Organizations and Agencies (Model 2)**. Member state organizations and agencies participating in the overall network vary in their degree of structure and in their governance strategy. Some may rely mainly on increasing the capacity of existing agencies or partnerships and others may require the creation of new entities.

The WFD is enforceable as it is "binding upon member states with respect to the results that have to be achieved" (Leb 2010:2). Reporting procedures are an integral part of European environmental policy. For the WFD, both informal and required reporting processes have been established to provide the European Commission with information regarding the implementation of the policies (WISE 2003). The European Commission is a governing body which represents the EU as a whole and is responsible for implementing and overseeing EU policy, including the WFD (Europa, European Commission 2011). In addition to being held accountable by the European Commission, member states voluntarily report to geographically appropriate international commissions (WISE 2003).

Table A-4.2 provides a chronological representation of the milestone events that make up the history of the EU Water Framework Directive.

Table A-4.2: EU Water Framework Directive Program Summary and Timeline

Date	Conservation Initiative/Milestone	Description and Implications
1972	UN Conference on the Human Environment in Stockholm	Environmental issues were first addressed by the European Economic Community (EEC), a precursor to the European Union (Leb 2010).
1986	Single European Act	Created a framework to construct European environmental policy (Leb 2010).
1992	Maastricht Treaty	The Maastricht Treaty formed the EU and initiated an environmental program guided by the principle of sustainable growth the precautionary principle. The precautionary principle refers to the concept that decisions must be made in the face of scientific uncertainty (Leb 2010).
1992	United Nations' Rio Declaration on the Environment and Development	Legitimized the use of economic instruments (e.g. taxes, duties, financial assistance, and negotiable permits) for environmental good (Europa 2006).

Date	Conservation Initiative/Milestone	Description and Implications
1997	Water Framework Directive Proposed	10 years after the Council identified the need for comprehensive water policy, the Commission published its first proposal in February 1997 (Foster et al. 2001).
2000	Refined Precautionary Principle	The European Commission revised the precautionary principle application to say, "Where there are threats of serious or irreversible damage, lack of full scientific certainty shall not be used as a reason for postponing cost-effective measures to prevent environmental degradation" (Commission 2000:11).
2000	Water Framework Directive	In response to public and environmental group concerns, the WFD was initiated in 1995 and adopted in 2000 to create a collaborative, regional level approach to water policy. The WFD provides the European Commission with enforcement power to require reporting from and assistance to the member states in relationship to directives. The following organizations and agencies help to create this support network (WISE 2003): • *Eurostat* – the Statistical Office which provides data and information which help the Commission determine the effectiveness of the WFD • *Communication Information Resource Center Administrator* (WFD CIRCA) – to promote an increases information exchange and to facilitate the work in the numerous expert groups, the Commission set up an internet-based platform • *Joint Research Centre* – provides scientific and technical advice to the Commission, members states and others to support EU policies • *European Environment Agency (EEA)*– The EEA delivers information to policy makers and the public for the implementation of sound environmental policies. The EEA utilizes networks and information sharing process to obtain information, such as the EUROWATERNET which provides information on water quality and quantity across Europe. • *Member States* - EU Member States create River Basin Districts (RBD) – each must assign a "Competent Authority" to deal with the WFD. Under WFD member states "shall encourage involvement of interested parties in the implementation of the directive, in particular in the production review and updating of the River Basin Management Plans" (Wise 2003).

Funding Summary:

The most innovative goal of the WFD is to account for the *true cost* of water in member state water pricing. This is also the most contentious of WFD's policies. Countries with a large, subsidized agricultural base were the most resistant to the legislation and succeeded in slowly weakening the strength of the initiative (Leb 2010).

The European Commission defines water price as "the unit or overall amount paid by users for all of the services that they receive in terms of water, including the environment" (Europa 2006). This is meant to encourage sustainable use and to help meet the goals of WFD in a cost-effective manner. However, the European Commission holds that water pricing must not be employed alone, but in combination with other EU policies (e.g. agricultural) to properly incentivize sustainable water use (Europa 2000; Europa 2006). The WFD's watershed restoration planning efforts will serve as a mechanism to integrate water pricing into environmental protection through the creation of its river basin management plans (Europa 2000).

In a July 2000 Commission communication, Environmental Commissioner Margo Wallstrom stated:

> As with other scarce resources, water has a price, which users and polluters must pay. Through adequate water pricing we can ensure that water resources are protected at lower costs and help preserve water resources of high quality for future generations" (Europa 2000). She went on to state that, "Several Member States already make use of water charging, and we are not starting from scratch. With this initiative the Commission wishes to contribute to improving the efficiency of existing instruments and develop more cost-effective charging mechanisms across the EU. This will help us achieve a high level of protection of our water resources.(Europa 2000).

Assigning this "true cost" to water resources is acknowledged as a difficult task. To achieve it member-states were to conduct economic evaluations of water costs by 2010. This analysis must include environmental and resource costs in accordance with the *polluter pays principle*, holding that those that pollute the water should be responsible for the cost of its purification. Implementation of these studies is behind and overall process has been slow. As of 2007, only 14 of 25 member states had completed the initial reporting (Associated Press 2010). In part, this slow pace of implementation may be due lack of funds. Member states are responsible for financially supporting such studies as well as any legislation, administrative tasks, technical implementation, and monitoring efforts needed. Such tasks are expensive. The United Kingdom estimated implementation costs up to 2010 and maintenance costs for the following thirty years may range between 3.2 to 11.2 billion euros ($4.1 to $14.5 billion US dollars)(Leb 2010).

Applying economic principles directly to water is further complicated by the fact that water is not simply a commodity; it is a necessity of life. Thus, a basic principle of WFD is, "water is not a commercial product like any other but, rather, a heritage which must be protected, defended and treated as such" (European Parliament 2000:1). In 2010, the United Nations' (UN) Human Rights Council passed Resolution 64/292, which recognizes the human right to water and sanitation and acknowledges that clean drinking water and sanitation are essential to the realization of all human rights (UNDESA).

Table A-4.3 below provides a summary of the primary governance structures in the Water Framework Directive and their funding sources.

Table A-4.3: Summary of EU WFD Restoration Governance Structure & Funding Sources

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
OVERALL – European Union Water Framework Directive (WFD)				
Model 2. Second-order Network (International Partnership Mandated Network of Member State Organizations and Agencies)	Increased Capacity in Existing EU Partnership and Agencies – The existing EU and European Commission serve as the centralized enforcer of the legislations while member state's create governance structures necessary to implement requirements Statute of Authority – Single European Act, Maastricht Treaty, Water Framework Directive	European Union/European Commission: Funded by EU budget which is derived from Member State support payments	High	Unknown
		Member States: Varies, are expected to cover costs of supporting and implementing WFD requirements, altered water pricing is expected to help support cost of project implementation	Unknown	Unknown
European Union				
Model 4. Existing Agencies	Increase Capacity in Existing Organizations –The EU and specifically the European Commission Statute of Authority - Single European Act, Maastricht Treaty, Water Framework Directive	European Commission: Funded by EU budget (which is derived from Member State support payments) through direct allocation	High	Unknown
EU Member States				
Model 4, Model 1, and Model 2. Will likely vary from Existing Agencies, Partnerships, and Networks to Second-order Organizations	Varies – Unknown Statute of Authority – Water Framework Directive	Member States Administrative: Costs of implementing WFD are the responsibility of individual member states. Each member state must decide how this is done.	Unknown	Unknown
		Member States Implementation: The public will likely fund water management by paying the "true cost" of water as assigned.	Unknown	High

Suggested Applicability to the Colorado River Basin:

At first glance, the governance structure of the EU's WFD is difficult to compare to a theoretical CRB restoration initiative. The WFD enforces environmental regulations on a different continent under European national and international governments. However, if one considers the EU to resemble the US federal government and each European member state to resemble an American state, the framework translates more readily. Using this perspective, there are two aspects of the WFD that seem especially pertinent to a CRB initiative: 1) the overarching legislation that provides a statute of authority to address all water-related environmental health issues throughout the EU's entire jurisdiction; and 2) the incorporation of implementation cost into the legislation with the requirement to assign and implement the "true cost" of water, including environmental costs.

One appealing aspect of the WFD is that it addresses the health of every water body in the EU and has the capacity to implement watershed, lake, or bay specific legislation at a regional level. Currently, the CWA and the Endangered Species Act (ESA) are the only regulations requiring action on ailing waterways in the US. These pieces of legislation are imperfect, limited, and are not inherently structured to address a comprehensive, watershed wide suite of issues. Alternatively the National Estuary Program (NEP) (1987) has a broader scope and helps to achieve water quality in both coastal and non-coastal watersheds throughout the US but is is not enforceable through legislation and is focused on more on estuaries than rivers. CRB does not have a compelling estuary approach. Additionally, it seems to work primarily on smaller scale projects or form a very small and relatively powerless function in wider partnerships.

The CRB does not currently enjoy a strong US national focus supporting the protection or restoring of its environmental health. Several US NGOs are pushing for a US national scale effort to address all the "great rivers" or "great watersheds." The WFD could serve as a useful model for such an approach and to consider if it would be appropriate to seek legislation to support watershed restoration nation-wide.

The second interesting innovation is the fact that the WFD inserted its major funding mechanism into the requirements of its founding legislation. The WFD is requiring every member state to conduct an economic study to decide upon the "true cost" of water during the legislation's initial planning stages. These costs are to account for the industrial and environmental infrastructure required to meet water delivery demands and will fund work conducted under the initiative. The costs for this study and planning costs are to be covered by each member state. This work is occurring unevenly across the member states as economic situations vary widely throughout the EU. Some feel that having the European Commission support some of these initial costs would aid in the implementation of the legislation. Thus, those interested in a CRB restoration initiative could learn more about the political realities of implementing the "true costs" of water from the WFD.

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Appendix A-5: Murray-Darling Watershed, Australia

Model 2. Second-Order Organization and Model 3. Market-Based Component (new federal authority managed regional network with a "top down" market component)

Governance Structure Summary:

Table A-5.1 provides an overview of the location, stakeholders and governmental agencies and legal framework influencing the Murray-Darling program.

Table A-5.1: Murray-Darling Basin - General Information

Location/Jurisdiction	The Basin incorporates Australia's three longest rivers: the Murray, the Darling, and the Murrumbidgee. The Basin drains one seventh of the continent.
Non-Governmental Stakeholders	Agricultural industry, individual water entitlement holders, environmental organizations
Government Agencies Involved	Australian federal government, States/Territories: New South Wales, Victoria, Australian Capital Territory, Queensland, South Australia
Underlying Drivers of Degradation	Intensive water diversion and utilization has resulted in insufficient flows for both consumptive water use and water needs of the natural system, as well as water quality (salinity) issues, and habitat degradation.
Statutory Authority	Commonwealth Water Act (The Water Act) of 2007 - Created the Murray-Darling Basin Authority
Legislation	• 2008 Water Act Amendment (established interstate cooperation) • Federal "Water for the Future" program - 2008

The challenges facing the people of Australia's arid Murray-Darling Basin include an over-allocated and dwindling water supply, riparian habitat decline, stream salinity increases, and an increasing dominance of invasive species. In order to address these challenges the 2007 Commonwealth Water Act established a new authority titled the Murray-Darling Basin Authority (MDBA) and tasked it with preparing a basin management plan. This plan is currently in draft form and the details of the proposed plan are still being negotiated. The final plan must include sustainable (water) diversion limits (SDLs), water trading rules, an environmental water plan, water quality and salinity management plans, and must address critical human water needs (Claydon 2010).

In addition, a Water Act Amendment was signed in 2008 creating an independent water market to facilitate the movement of water to its most effective use, while providing for environmental constraints (MDBA 2011). The amendment also requires that water charging regimes reflect the full cost of supply to end users, including environmental externalities where feasible (COAG 2008). When the basin plan establishes SDLs, which will essentially cap the amount of water available for irrigators, this market will then serve to trade water still available under this cap. This approach amounts to a cap and trade water allocation program. The Commonwealth Environmental Water Holder (CEWH) was also

established by the 2007 Commonwealth Water Act to support environmental goals of the basin management plan by holding water rights purchased by the Commonwealth for the environment (Claydon 2010).

The MDBA will be the primary regulator of compliance with the Basin Plan while Basin states' water resource plans will be the primary means to ensure compliance of water entitlement holders.

> While the Authority plays a significant strategic role across the Basin, each Basin state has the authority and responsibility to manage the use of its water resources within the framework set by the Basin Plan. As a result, the Basin governments — New South Wales, Victoria, Queensland, South Australia and the Australian Capital Territory — will play a major role in implementing the Basin Plan (MDBA 2011:1)

The governance structure of the Murray-Darling Basin restoration initiative can thus be thought of as a **new federal authority managed regional network with a "top down" market component (Model 2 and 3)**. The market structure is considered to be "top down" as it is mandated by national legislation and operated based on rules and regulations enforced by a nationally created authority. The issue with this approach is that the structure is not very inclusive and there is evidence that the initial management plan has not been well received by rural or agricultural constituents. Including these stakeholders in the process in a more effective manner may reduce conflict.

The Murray-Darling Basin initiative exists within a larger framework of water management governance titled "Water for the Future", which is a 10-year initiative to develop a single, coherent, national framework that integrates planning for rural and urban water issues in a future with less water. This program will support the MDBA's basin management plan (Wong 2008, Dept. of the Environment 2010). As Senator Penny Wong stated about the Water for the Future program:

> Australia needs a truly national approach to water because it cannot be the domain of one single government. Like many areas of public policy involving multiple levels of government, water policy has been derailed by bickering and blame. As a result, progress on many of the important issues has been a case of too little, too late. Water for the Future recognizes that water shortages are a serious threat to our economy and way of life. Problems like climate change, over-allocation and water shortages don't get fixed by denial, delay or pointing the finger (Wong 2008:2).

Progress:

Initial water trading in the Murray-Darling Basin prior to the final basin management plan has resulted in reallocations of water to the agricultural sector, increasing the country's GDP, and ensuring water is used for productive purposes *within* the basin, as opposed to other parts of the country. However, this has also led to an overall increase in consumptive use of water in the Basin and has not led to the hoped for increases in environmental flows despite the initial cap of water extractions (Bell &Quiggin 2008). There is also evidence that water trading has increased instream salinity in the Murray over the study period, though this increase was mitigated through the Basin Salinity Management Strategy (NWC 2007).

Bell and Quiggin feel that this lack of progress towards environmental goals is a result of what amounts to an over-confidence in the self-regulating abilities of a water market. They use the following statements from various researchers to support this:

> NWI is 'seriously compromised' by confusion between its environmental goals and the market means chosen to achieve them (Connell & Dovers 2006 as cited by Bell & Quiggin 2008:724).
>
> Given such outcomes, it is imperative that policymakers learn not to rely on markets alone to achieve environmental goals(Bell & Quiggin 2008: 724).
>
> The notion that improved water efficiency will free water for environmental purposes is simplistic and will not work. On the contrary, the demand for irrigation use is likely to increase with water savings unless there is some explicit mechanism to encourage saved water to be reallocate (Meyer 2000 as cited by Bell & Quiggin 2008:724).

Bell and Quiggin argue that market-based governance is not self-managing and that such an "explicit mechanism" must come from government, or meta-governance. Meta-governance would design and regulate the market to ensure that environmental or other marginalized needs such as transaction costs are addressed. They do agree that higher water prices driven by the market will encourage more efficient use of water but that savings will not be left to the environment without regulation. Such government intervention may include further tightening and more rigorous enforcement of the water cap, directly purchasing water for the environment, or some new and innovative solution perhaps including an entirely new governance approach (Bell & Quiggin 2008).

Currently, the government is purchasing most of the environmental flows through the 2008 Water for the Future program's *Restoring Balance in the Murray-Darling Basin* initiative (Claydon 2010). But it is unknown whether the government can sustain this purchase rate or how it will fund the effort over time. And as Bell and Quiggin also discuss, if the government is the main buyer in the market it may negate the market's ability to serve as a "vehicle for structural adjustment" (2008:720). When it was first announced that the government would have a larger role in water buy backs, critics suggested a new policy approach to acquire environmental water through government mandated allocations. In this scenario the market would remain but would only serve to encourage structural adjustment among water users and not seek to address environmental needs (Bell & Quiggin 2008).

Bell and Quiggin summarize by stating:

> Hence, the use of markets as a form of governance does not amount to a simple offloading of tasks or responsibilities to private sector actors. The use of market instruments cannot be understood simply in terms of a theory of markets as autonomous and spontaneously-arising mechanisms for resource allocation (2008:726).

Below they postulate that thinking of a market or network governance structure as an *active* public-private partnership, where the role of government is appropriately respected and employed, is a necessary step forward, although admittedly a very difficult one.

> The notion of markets or other forms of governance, including networks, as forms of public–private partnership also highlights the limitations of some strands of current governance literature which seek to portray governance arrangements as 'self-organizing' (sic) or which seek to downplay the role of government. In the case at hand, most of the heavy lifting will need to be done by government with markets and networks playing at best a supportive role. This suggests the need to integrate research more fully into meta-governance and issues dealing with 'state capacity' into ongoing governance research (2008:727).

It will be interesting to see how the Murray-Darling market governance structure will change or be reexamined as the water trading rules are further developed in consultation with the Australian Competition and Consumer Commission.

Figure A-5.1: Governance of the Murray-Darling Basin Authority (MDBA 2008)

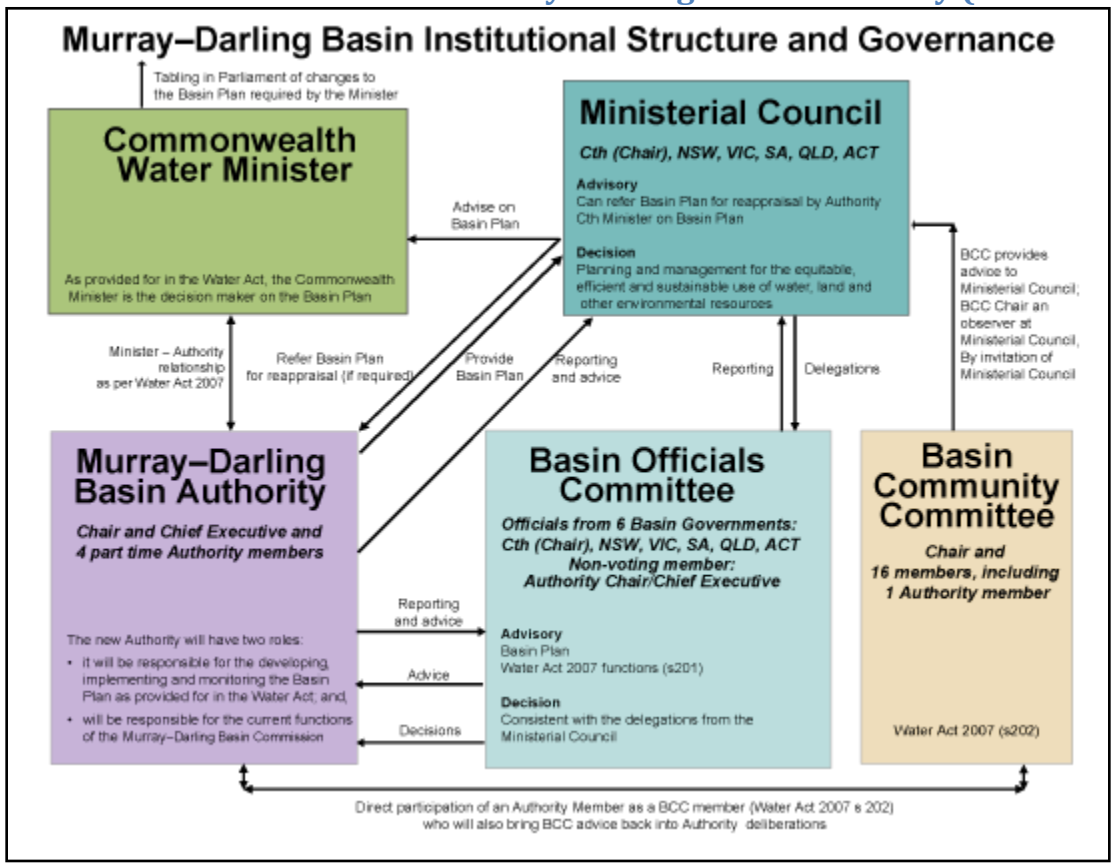

Table A-5.2 provides a chronological representation of the milestone events that make up the history of the Murray-Darling Basin.

Table A-5.2: Murray-Darling Basin Timeline

Date	Murray-Darling Conservation Initiative/Milestone	Description/Implications
1978	National Water Resource Financial Assistance Act	Passed by the Federal Commonwealth, greatly increasing federal control of water resources
1995	Cap on diversion quantity imposed	Considered one of the most important decisions in the history of water resources management in Australia, successfully reducing the threat of environmental degradation
2004	1. National Water Initiative (NWI) 2. National Water Commission Act (NWC)	1. NWI is a state and territory intergovernmental agreement to better manage water resources. 2. NWC established the National Water Commission, which advises the Council of Australian Governments (COAG) on national water issues and progress made through the NWI.
2005	Australian Water Resources (ARW) 2005 report	Provided NWC with a baseline assessment of Australia's water resources. Three core areas of concern: 1) water availability, 2) water use, 3) river and wetland health.
2007	Commonwealth Water Act (The Water Act)	Established the independent **MDBA),** and tasked it with preparing a basin management plan. Required MDBA to establish long-term **sustainable diversion limits (SDLs)** for both surface water and groundwater, which cannot compromise critical environmental assets, ecosystem health, or ecosystem services and must meet critical human water needs. Also established a **Commonwealth Environmental Water Holder** to manage environmental water to protect and restore the environmental assets of the Murray-Darling Basin (Australian Government 2011).
2008	Water for the Future – **Restoring Balance in the Murray-Darling Basin Program**	The Water for the Future program is a 10 year initiative to develop a single, coherent, national framework that integrates planning for rural and urban water issues in a future with less water. Restoring Balance in the Murray-Darling Basin program is a major part of the initiative that will invest $3.1 billion to purchase water entitlements from irrigators looking to sell (Wong 2008, Dept. of the Environment 2010).
2008	Intergovernmental Agreement (IA) on Murray-Darling Basin Reform signed, leading to the 2008 **Water Act Amendment**	The IA on M-D Basin Reform was signed by all states and territories involved, leading to the **2008 Water Act Amendment** that established the precedent for interstate cooperation. Two key water policy reform measures included in the Water Act Amendment: 1. Independently regulated **water market*** and trading agreements across the southern connected basin, and 2. Water charging regimes that reflect the full cost of supply to end users, including environmental externalities where feasible.

Date	Murray-Darling Conservation Initiative/Milestone	Description/Implications
		*Newly established, independent water market managed by the Australian Competition and Consumer Commission (ACCC)
2010	*Guide to the Proposed Murray-Darling Basin Plan*	The first part of a 3-stage process to develop a management plan for the Basin. This document outlines a long-term plan for ecological health, including reducing current water allocations to increase environmental flows. The "*Guide*" has been controversial with rural towns and agricultural producers, and supported by various environmental organizations.
2012	Estimated date for release of MDBA final plan for the Basin.	
2012-2019	Estimated release of State's water resource plans	

Funding Summary:

In order to mitigate the expected socio-economic impacts associated with SDL reductions in available water allocations, the Australian government is purchasing existing water entitlements from willing sellers and from a share of the water savings made through the national water plan including irrigation efficiency upgrades (MDBA 2009). These actions are carried out through the Water for the Future program's *Restoring Balance in the Murray-Darling Basin* initiative. The program's budget totals AUD$12.6 billion ($13.3 billion US) for distribution over a 10 year period (Claydon 2010). This is entirely derived from federal appropriations pursuant to the Water Act of 2007 (ADSEWPC, Environment 2010). AUD$3.1 billion ($2.9 billion US) will be used to purchase water entitlements from willing sellers. AUD$5.8 billion ($6.1 billion US) of this budget will be dedicated to increasing rural water use efficiency, with the goal of generating additional environmental flows (Claydon 2010). It is also hoped that purchasing water rights from willing sellers will generate enough additional water for the natural system (MDBA 2011).

Initiated by these large sums of federal spending, the initiative looks to develop self-sustaining water markets to help re-allocate water to more efficient uses, and to encourage conservation and increase the environmental flows necessary for ecological recovery. The water market development is not a funding source per se, but it does help to replace the need for funding (NWC 2007). As discussed above, to date, water trading in the Murray-Darling Basin has resulted in increased agricultural water use and an increase in the country's GDP. However, the market has not succeeded in providing the anticipated increases in environmental flows (Bell &Quiggin 2008). It is expected that the final water trading rules being developed for the proposed (final) Basin Plan will rectify this issue.

An additional challenge will be to ensure a demand for instream flows sufficient to support an independent market. In order for a market to be successful, there must be a demand for the good supplied (i.e. environmental flows). It is not entirely clear whether this demand is regulatory in nature for the Murray-Darling Basin Plan or voluntary, perhaps related to some incentive program. State by state and basin-by-basin policy reform to facilitate supply is challenging but "the financial challenge is paramount" (Aylward 2009:7).

Table A-5.3 provides a summary of the primary governance structures in the Murray-Darling Basin and their funding sources.

Table A-5.3: Summary of Murray-Darling Basin Restoration Governance Structure & Funding Sources

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
OVERALL - Murray-Darling Basin Authority (MDBA)				
Model 2. New Federal Authority Created	Second-order organization – Independent authority tasked with preparing a basin management plan Statute of Authority – Commonwealth Water Act	Federal: AUD$3.1 billion ($2.9 billion US) will be used to purchase water entitlements from willing sellers	Moderate	Low
		Market: Set up less as a funding source than as a mechanism to decrease funding need through market based reallocation of resources to best uses for humans and the environment	Unknown	Unknown
Independent Cap and Trade Water Market				
Model 3. Market	Market managed by Increased Capacity in Existing, Independent Organization – ACCC which provided water charge (including "true cost") and market rules Statute of Authority – Water Act Amendment	Market: largely supported by the federal Water for the Future Program funded by federal appropriations – future of private demand and funding unknown	Unknown	Unknown

Suggested Applicability to the Colorado River Basin:

The challenges facing the people of the arid Murray-Darling Basin are strikingly similar to those present in the climatologically similar CRB: economic dependence on an over-allocated and dwindling water supply, riparian habitat decline, stream salinity increases, and increasing dominance of invasive species. Past management decisions, extensive water diversions and utilization, severe drought over the past decade, and increasing climate fluctuations attributed to climate change have resulted in insufficient flows, water quality (salinity) problems, and poor ecosystem health.

Murray-Darling provides an example of a market-based strategy seeking to support sustainable funding to reach environmental standards. The lack of successful instream water transfers is evidence that the market aspect of Murray-Darling is faltering. This is potentially due to an inadequate market governance structure without appropriate consideration for the proper role of government, or meta-governance. In addition, the market's current reliance on appropriated funding from the government is not sustainable. It remains to be seen if there is a large enough demand for these water rights to sustain the market.

All of this information clearly displays what an incredibly complicated and difficult task it is to structure and implement a water market, particularly on such a large scale. Whether successful or not the effort will provide the CRB with many valuable lessons as it unfolds.

The following are three additional aspects of the Murray-Darling Basin Plan that may provide especially important information to the CRB.

1) Although the final version of the Murray-Darling Basin Plan has not yet been released, the process of developing the plan has involved extensive data collection, scientific monitoring, and public input. This is a valuable model for the development of a basinwide plan for the CRB.
2) If successfully designed, water markets can offer an important, and potentially significant, means of maintaining the socio-economic viability in an arid region. In 2008 and 2009 water trading increased Australia's GDP by [AUD] $220 million [$209 million US]. However, some localized economic hardships may occur, negatively affecting support for the program (NWC 2007).
3) Finally, the Australian government has allocated federal funds to assist Basin water users to make the transition to lower diversion limits over time. This type of federal initiation and commitment may prove to be an important component of the successful implementation of a long-term, sustainable management plan for the CRB.

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Appendix A-6: Columbia River Basin

Model 1. Inter-organizational Network with a Model 3. Market-Based Component (regulatory driven, bottom-up, network of markets)

Governance Structure Summary:

Table A-6.1 provides an overview of the location, stakeholders and governmental agencies and legal framework influencing the Columbia River Basin program.

Table A-6.1: Columbia River Basin General Information

Location/Jurisdiction	Washington, Oregon, Idaho, Montana, (Canada, Nevada, Wyoming, and Utah which are considered less prominent within the Basin)
Original Citizen Proponents	Fishermen, Native Americans, Waterfowl Hunters, Ecologists/Nature Lovers.
Original Legislative Champion	Northwest Power Act; National Marine Fisheries Service 2000 Biological Opinion
Underlying Drivers of Degradation	Population Growth, Hydroelectric dams, Agricultural Diversions
Statutory Authority	NEPA; ESA; The Northwest Power Act
Legal and Policy Considerations	Prior-appropriation doctrine

The Columbia River Basin is a highly productive agricultural region where large federal water projects including hydro-electric dams and water diversion infrastructure have enabled the over-appropriation of limited water resources. As a result, the riparian and aquatic ecological systems have suffered leading to the loss of approximately half of the salmon and steelhead habitat (CBWTP 2004). Consequently, the ESA is the driving federal legislation for restoring instream flows in the region. To address this issue the Northwest Power Act of 1980 formed a Northwest Power Conservation Council to develop and maintain a regional power plan as well as a fish and wildlife plan to address both energy needs and environment health. The Act requires that the hydropower consumers should bear the costs associated with mitigating the power plants' environmental impacts (NWPCC 2011).

In 1993, the Oregon Water Trust was created and was the northwest region's first effort to organize market-based water acquisition. It sought demand for environmental water purchases in a free market. This structure is likely an artifact of the limited willingness of property owners (especially water owners) to forfeit concrete water rights for the less tangible health of the ecosystem and public good. In theory, this climate of guarded property rights can be overcome by establishing well-organized and reliable water and natural resource markets which exchange concrete water rights for concrete cash. This is the general goal of the Columbia River Basin approach (Aylward 2009).

The trust was designed to use private funds to acquire and hold instream water rights for the ecosystem with little government interference or control. As the water trust movement spread to the Deschutes River Conservancy (1996) and the Washington Water Trust (1998) water trusts

lost their free market roots. They moved the responsibility of managing instream use water holdings from trusts or conservancies to the state and replace private contributions with public, regulation fueled funding. This government and regulation funded, not market funded, water trust movement is thriving (Aylward 2009).

These market structures developed in a *piecemeal* fashion in response to watershed or statewide policy within the four main US states comprising the Columbia River Basin (Garrick et al. 2009). The state centric nature of these markets is partially due to the 1935 US Supreme Court decision which affirmed the 1877 Desert Lands Act, allowing it to vest primary authority for water allocation to the states (Garrick et al. 2009). While the Federal government's ESA and CWA legislation does influence water use, states hold the ultimate authority. Garrick et al. state:

> Vesting regulatory authority for water allocation at the state-level has prevented uniform adoption and application of the policy reforms needed to recognize the environment, or instream flows, as a beneficial use, creating a complex patchwork of legislative and regulatory jurisdictions for restoring stream flows to conserve fish and wildlife. Accordingly, the primary legislative preconditions for market-based reallocation to restore freshwater ecosystem services - the legitimacy of the environment as legal water allocation and the transferability of water rights to meet environmental needs in stressed basins – have progressed throughout the Columbia Basin while remaining elusive for some Western states (2009:8).

There are many water markets operating in the Columbia River Basin; most of these are listed below in *Table 2: Columbia River Basin Program Summary and Timeline*. Due to the multiple agencies and organizations working loosely together in this system the overarching governance structure can be thought of as a **regulatory driven, bottom-up, network of markets (Models 1 and 3)**. The structure is regulatory driven in that it primarily addresses ESA compliance, yet a bottom-up initiative in that the chosen market focus is a driven by individual watersheds.

In 2002 the Columbia Basin Water Transactions Program (CBWTP) was formed. The CBWTP is an overarching non-profit working to connect the various markets The CBWTP was established in response to the Northwest Power Act and ESA compliance, to serve as a clearinghouse of information and to help institute and organize innovative water market transactions among regional stakeholders. The CBWTP is managed by the National Fish and Wildlife Foundation (NFWF) in cooperation with the Bonneville Power Administration (BPA), an Oregon based non-profit. Its purposes are to serve as a clearinghouse of information, to provide water market administration, and to provide funding to state and watershed efforts to increase instream flows. The program is managed by an existing agency but is fairly independent. For the purposes of this discussion the CBWTP's governance structure will be described as a **non-profit managed network of markets**.

Within this network, there are multiple governance structures operating at different scales. As it is difficult to discuss the structures and funding streams of the entire network two additional sub-structures will be focused upon: 1) the Deschutes River Conservancy (DRC), a non-profit managed market and 2) the Willamette Partnership (WP), a unique example of a partnership supporting markets.

The DRC was founded in 1996 with "a mission to restore stream flow and improved water quality in the Deschutes River Basin" (DRC 2010). The non-profit DRC has formed a unique partnership with the Central Oregon Irrigation District (COID) - with support of the CBWTP and BOR - to address the flow problems of the Basin. This partnership allows water right holders to voluntarily sell excess water rights to the COID. The irrigation district then transfers a portion of these water rights to the DRC for the dedicated purpose of restoring flows in the middle reach of the Deschutes River (Aylward 2009). The DRC is a **non-profit managed market**. The DRC is working toward a targeted flow rate that it is tied to ecological outcomes of interest including fish habitat, reduced erosion, and increased water quality (DRC Stream Flow 2010).

The WP was initially a governor's task force meant to create a coordinated and effective market to protect the Willamette River Basin, a tributary of the Columbia River. The WP works to develop market mechanisms that will aid its goal of "increasing the pace, expanding the scope, and improving the effectiveness of conservation" (WP, About 2011). The WP working to accomplish this by strategically investing in the environment, creating a transparent market to buy and sell restoration benefits, and by creating business models that move beyond compliance based restoration to a stewardship approach (WP, About 2011). It also seeks to empower farmers and land managers to participate in the progam by prioritizing restoration locations and providing financial benefits from restoration work (WP 2011). The WP is composed of a coalition of leaders from throughout the river basin (WP, About 2011) and can be thought of as a **partnership** creating tools **to improve and support market governance**. This partnership structure has supported the creation of visions, goals, and objectives for the market based funding mechanisms that the WP supports (WP 2001). The creation of such structured goals may ensure an increased level of effectiveness.

Table A-6.2 provides a chronological representation of the milestone events that make up the history of the Columbia River Basin.

Table A-6.2: Columbia River Basin Program Summary and Timeline

Timeline	Columbia River Basin	Description/Purpose
1937	Bonneville Power Administration	The BPA, a self-financed federal agency under the US Department of Energy, became the steward of the Northwest's federal hydroelectric system. The BPA provides one-third of the power to the Pacific Northwest, of which 83 percent is derived from hydro-electric dams (BPA 2006).
1980	Northwest Power Act and Northwest Power and Conservation Council	The Northwest Power Act was written in response to growing concern for native salmonid populations and the lack of equity afforded to local tribes. The Act requires that impacts to fish and wildlife from hydropower be mitigated and that consumers of electric power, through their rates for power services should bear the costs associated with mitigating the impacts of the power plants. BPA's role in environmental stewardship was increased by this act. The Act established the Northwest Power Act and Northwest Power and Conservation Council (NWPCC) which was, "Not quite a federal agency, not a state agency" (Harden 1996). The Council is responsible for developing and maintaining a regional power plan and a fish and wildlife program to ensure that environmental protection and energy needs are in "balance." (NWPCC 2011).
1993	Oregon Water Trust	The Oregon Water Trust was founded to work cooperatively with landowners to keep more water in their rivers and streams. In 2008, the Trust and Oregon Trout, another nongovernmental organization with a similar to restore freshwater streams for fish habitat, merged into the Freshwater Trust.
1996	Deschutes River Conservancy	The DRC was founded to restore stream flows and improve water quality in the Deschutes River Basin. The nonprofit formed a unique partnership with the COID and the BOR to address flow issues in the Basin. Water right holders can sell excess water rights to COID and the irrigation district and then transfers a portion of the water rights to the DRC to restore flows to the middle Deschutes River.
1996	Willamette Partnership	The WP began in 1996 as a Governor's Task Force to develop mechanisms for the coordinated and effective protection and restoration of the Willamette River Basin in its entirety. The WP was established with the help of federal grants including the EPA's Target Watershed Grant Program (2005) and the National Resource Conservation Service (NRCS) Conservation Innovation Grant (2007). The WP is developing market based mechanisms similar to the BEF Water Restoration Credit and other ecosystem service credits such as wetlands, salmon habitat, upland prairie habitat, and water temperature.
1998	Washington Water Trust	The Washington Water Trust works to restore stream flows that help sustain the fisheries, water quality and recreational resources through the Washington State Trust Water Program. They also cooperate with diverse partners and initiate innovative and market-based projects to protect and

Timeline	Columbia River Basin	Description/Purpose
		restore Washington streams while honoring the values of their partners (WWT 2011).
1998	Bonneville Environmental Foundation	Bonneville Environmental Foundation (BEF), an Oregon-based nonprofit, was founded to lower carbon footprints with innovative market approaches. The organization started a Model Watershed Strategy in 2003 that involved a long-term, 10-year funding program, and technical support to watershed partners who agree to rigorous monitoring & evaluation protocols for projects.
2000	Biological Opinion	Written by the National Marine Fisheries Service (NMFS), this opinion is the primary regulatory driver that has instigated much of the restoration efforts in the Basin.
2002	Columbia Basin Water Transactions Program	The Columbia Basin Water Transactions Program (CBWTP) began in 2003 to serve as a clearinghouse of information, and provide water market administration and funding to state and watershed efforts. CBWTP is managed by the National Fish and Wildlife Foundation in cooperation with the Bonneville Power Administration and the central purpose is to use "permanent acquisitions, leases, investments in efficiency, and other incentive-based approaches to improve instream flows in key stream reaches within the Basin states." The drivers of this program's formation are the ESA and Northwest Power Act. This program jurisdiction only covers the states of WA, OR, MT, and ID. Partners include the WWT.
2005	Steelhead Critical Habitat Designated	ESA Critical Habitat was designated on the Columbia River for steelhead in 2005 and the species was listed as Threatened in 2006. Chinook salmon was listed as threatened and endangered for parts of the Columbia Basin in 2005 (NOAA-NMFS 2009).
2010	BEF Water Restoration Credit	BEF helped to organize the CBWTP and WP and implemented the Water Resources Certificate (WRC) program, which is a voluntary water offset credit. Each WRC certificate represents 1,000 gallons of water that has been returned to a stream to support natural riparian and aquatic ecology.

Progress:

Overall, there seems to be an awareness and interest among the residents of the Columbia Basin in riparian health, which helps to justify the politically sensitive notion of leaving water in the river. People are willing to pay for the restoration of the streams and there is a mandate for the federal agencies, especially the BPA, to do so. These factors have contributed to restoration efforts in the Columbia Basin successfully increasing instream flows. The CBWTP's 2009 annual report claims that the program has supported 4.8 million acre feet of designated instream flows in the Columbia Basin (NFWF & BPA 2009). The 2010 annual report put that number at 5.3 million acre-feet (CBWTP 2010).

The DRC claims to have accomplished more in the past 14 years than any other stream flow restoration group in the Columbia River region (DRC, About 2011). In 2007 the DRC program placed 27,710 acre-feet of water into the Deschutes River system. Economic benefits have also been realized through DRC's water leasing program. Farmers who participated in the DRC were able to earn approximately $23.13 per acre-foot of water left in the stream without forfeiting their water right (West Water 2008).

The WP's accomplishments are not measured by acquired instream water rights but by the creation of functional ecosystem marketplace tools.

Collectively, these efforts seem to be producing environmental results. In 2010, the "Snake River fall Chinook (a federally listed species) set an all-time record for returns up the Snake River through Lower Granite Dam" (BPA 2010).

Funding Summary:

Funding varies throughout the Columbia River Basin. To narrow the discussion, this summary focuses on CRWTP, WP, and DRC funding systems. The CRWTP was established to help institute new and organize existing innovative water market transactions within the Columbia River Basin. The CRWTP is quietly funded by hydro-electric energy consumers from the Bonneville Power Administration. This funding is based on mandates to comply with environmental regulations; most notably, NEPA and ESA compliance and related regulations established to protect and restore native salmonid populations.

The WP was started with federal grants including the EPA's Target Watershed Grant Program (2005) and the NRCS Conservation Innovation Grant (2007). Future funding is meant to come from market based mechanisms such as an Ecosystem Credit Accounting System that is under development.

From 2009 to 2011 the DRC, through the BOR has received $3.6 million of American Recovery and Reinvestment Act Funds. A private, family owned water supplier called Avion Water, which supplies water to customers in the Basin has developed a voluntary check-off on their water bill that allows water users to donate to the DRC. The program has already exceeded expectations by raising $12,000 annually in its first two years which represents six percent of the DRC revenue stream (Aylward 2009; DRC, Blue Water 2010).

Other funding sources for Columbia River Basin include voluntary credits (such as BEF's WRC certificates), grant funding, and federal appropriations.

Table A-6.3 provides an overview of the governance structure models and funding mechanisms of each of the components of the Columbia River Basin and an assessment of each funding mechanism.

Table A-6.3: Combined Summary of Columbia River Basin Restoration Governance Structure & Funding Sources

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
OVERALL – Columbia River Basin				
Model 1. Regulatory Driven, Bottom-up, Network of Markets	Network of non-governmental organizations foster informal collaboration to share information and establish market-based approaches to achieving sustainable water use and healthy river systems. Statute of Authority - drivers include the ESA and Northwest Power Act	Market-based approaches to achieving sustainable water use and healthy river systems through preservation of instream flows and other mechanisms.	Varies	Varies
Columbia Basin Water Transactions Program (CBWTP)				
Model 1. Nonprofit Managed Network of Markets	Increased Capacity in Existing Organizations (National Fish and Wildlife Foundation and Bonneville Environmental Foundation) to support a Network of Markets Statute of Authority - Northwest Power Act, ESA	Market-based mechanisms; However, the majority of funding, or demand, is provided by the Bonneville Power Administration (BPA) through hydropower surcharges (85%), as well as US Treasury tax credits (15%).	High	High
Deschutes River Conservancy				
Model 3. Nonprofit Managed Market	Second-order Organization managed Market – A new non-profit was created to improve the health of the Deschutes River through market mechanisms Statute of Authority – not directly linked to one although ESA and CWA likely have some influence	Market-based mechanisms; Selling excess water rights	Unknown	Unknown
		Voluntary donations via private corporation water bills	Low	Moderate
		Federal appropriations and American Recovery and Reinvestment Funds	High	Low

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
Willamette Partnership				
Model 1. Partnership	Second-order Organization managed Market – The WP was created to improve the health of the Willamette, laying out strategic restoration plans including goals for improvement (WP 2001) Statute of Authority – not clear but ESA and CWA likely have some influence	Grant funding for startup and to develop market support mechanisms	High	Low

Suggested Applicability to the Colorado River Basin:

The primary regulatory drivers for much of the restoration effort in the Columbia River Basin are the Northwest Power Act of 1980, the 2000 Biological Opinion written by the NMFS and the ESA. These regulatory hooks have been somewhat supplanted in the CRB by the Upper Colorado Endangered Fish Recovery Program and the Lower Colorado Multi-Species Recovery plans.

The Columbia River Basin is loosely organized under a voluntary network of information sharing and innovative market based approaches to water resource management. Small scale and some basinwide collaboration are already present within the CRB due to both regulatory drivers, such as Endangered Species Recovery Programs, and voluntary efforts, such as local watershed restoration partnerships. The Columbia basin's history of piloting watershed or state scale market approaches could serve as a model for how existing partners within the CRB could collaborate on multiple scales to initiate market systems. The CBWTP also provides a model for bringing various successful CRB market pilots together to help coordinate efforts.

The Columbia Basin's locally based initiatives that focus on sub-basins and watersheds seem to help build public trust and participation. John Wilson, an Oregon rancher with the Wilson Cattle Company states:

> When it comes to water challenges in the Columbia Basin, one thing most folks can agree on is that we'd like to solve them ourselves. I think one of the best ways to make sure water gets where it needs to go, is to use the free enterprise system to give property owners some choices. That's what I like about the Columbia Basin Water Transactions Program (CBWTP 2004).

The piece that seems to be missing from the Columbia Basin as a whole is a set of cohesive goals and priorities that would help to frame the effort and to gain greater levels of private sector buy-in to the program. Tributaries and smaller scale efforts, such as the WP and DRC provide

such goals, priorities, and increased guidance for their market structures (WP 2001, DRC Stream Flow 2010). Achieving this at a basinwide scale could help the public understand what success looks like and why it is necessary to take difficult steps to get there. A CRB version of this program would benefit from such shared goals and priorities.

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Appendix A-7: California Bay-Delta Program/Delta Vision

Model 2. Second-Order Organization (federal-state collaboration with increasing city and county involvement)

Governance Structure Summary:

Table A-8.1 provides an overview of the location, stakeholders and governmental agencies and legal framework influencing CALFED.

Table A-7.1: California Bay-Delta Program- General Information

Location/Jurisdiction	California (San Francisco Bay-Sacramento-San Joaquin Delta ecosystem)
Non-Governmental Stakeholders	Agricultural and Urban water users, environmental groups, fisheries groups,
Government Agencies Involved	BOR, EPA, USFWS, NMFS, USACE, Central Valley Project (federal), California's State Water Project, local authorities: county and city,
Underlying Drivers of Degradation	Intensive urban and agricultural water use has resulted in insufficient flows for both consumptive water use and water needs of the natural system. Declines in water quality and habitat.
Statutory Authority (Meta-Governance)	National Environmental Policy Act (NEPA), CWA, ESA, and the California Environmental Quality Act (CEQA)
Legislation	• Central Valley Project Improvement Act (1992) • California Bay-Delta Authority Act (2002) • CA Executive Order S-17-06 (2007)

The California Bay-Delta Program (CALFED) was born out of the need to address ESA and CWA requirements. In 1989 the winter-run Chinook salmon and in 1993 the delta smelt, which both inhabit the California Bay-Delta, were listed as threatened species under the ESA. In 1991 the EPA determined that California's water standards for the Delta did not meet CWA requirements. As a result, in 1993 the USFWS, NMFS, EPA, and BOR formed a Federal Ecosystem Directorate known as Club Fed. In response to the EPA requirement that California adopt for new water quality standards for the Delta state agencies and Club Fed began to coordinate. The result was a science based water quality standard agreement titled the Bay-Delta Accord initiated the effort to create a large-scale, science based restoration plan to restore the Bay-Delta known as CALFED (Nawi & Brandt 2008).

Over the next ten years the agencies involved in CALFED worked to create a plan to address ecosystem restoration, water supply reliability, water quality, and levee system integrity. In 2000 a NEPA Record of Decision (ROD) was issued along with a ROD Action Plan.

In 2002 concerns were raised that the CALFED decision-making process would not adequately represent the diverse agencies involved in implementation. In addition, many thought that a new, independent agency would need to be formed to ensure that individual CALFED members adhered to the 2000 ROD and Action Plan. A compromise was reached by creating the California Bay-Delta Authority. Neither a coordinating body nor a *super-agency,* the Authority, oversaw activities by approving work plans and conducting annual reviews. Membership was divided among federal, state, and regional appointments. Participating federal and state agencies were responsible for program implementation. The Action Plan was to occur under the principle of balanced implementation, approaching all goals concurrently and distributing funds fairly (Nawi & Brandt 2008).

Unfortunately, the compromise that created the Authority never fully resolved the relationship between CALFED and federal and state agencies. The oversight granted to the Authority was a major point of contention for agencies that would prefer autonomy. This lack of clear leadership, and decision making authority hindered CALFED's effectiveness. The initiative struggled as the condition of the Bay-Delta continued to decline. In 2005 a critical review of CALFED was released by the Governor of California, citing a lack of leadership, diminished cooperation, and increased litigation. In 2006 financing authority was transferred from CALFED to the California Office of the Secretary of Resources, when the Authority failed to properly apply the principle of balanced implementation. The downturn continued in 2007 when a state committee declared CALFED dysfunctional to members of Congress. Meanwhile populations of the threatened delta smelt declined to critically low levels prompting the federal court to intervene (Nawi & Brandt 2008).

Additional problems with the program, identified by three separate independent reviews, are discussed in the Legislative Analyst's Office (LAO) 2009 report. The reviews found that the program's governance structure was ineffective, there was no clear leadership, priorities for the program were unclear, making implementation inefficient, and meaningful measures to track performance and hold the program accountable for outcomes were insufficient. The LAO's suggestions for moving forward were to improve the governance structure, set expenditure priorities, and create performance measures that are tied to legislative priorities and the budget process to ensure legislative oversight and to approve a financial plan that included the *beneficiary pays* principle (CLAO 2009).

CALFED and the Authority were replaced by the Delta Vision task force in 2008, though many of CALFED-related organizations (e.g. the science committee, binding agreements in the CALFED ROD) were retained (Isenberg et al. 2008b). In 2008, Delta Vision concluded its initial process by creating strategic recommendations for long-term, sustainable management of the Bay-Delta. Delta Vision's three main documents are the Delta Vision Final Report, Final Delta Vision Strategic Plan, and the Delta Vision Committee Implementation Report (Delta Vision, Delta 2007). For the past four years the California Natural Resources Agency has been working in collaboration with federal, state, and local agencies and conservation groups on a "Bay Delta Conservation Plan" (BDCP). The draft BDCP is currently available in draft form (BCDP 2010). The

governance structure to be employed by Delta Vision is not yet known. While Delta Vision is likely to be distinct from CALFED, it may retain some of the same characteristics such as federal and state agency collaboration.

It is not yet clear whether or not Delta Vision is finding success where the CALFED Authority did not succeed. However, it is encouraging that the Delta Vision program is seeking to better prioritize implementation projects. It is possible that the principle of balanced implementation employed by CALFED made it difficult to effectively address the most pressing issues in the Bay-Delta.

The five counties and numerous cities with land-use authority in the Bay-Delta were absent from the table in the early stages, gaining more involvement around 2008 (Nawi & Brandt 2008) perhaps in relation to Delta Vision's enactment around this time. Thus, the system of governance and management for the California Bay-Delta today can be categorized as a multi-agency, **federal-state collaboration with increasing city and county involvement (Model 2).**

Table A-7.2 provides a chronological representation of the milestone events that make up the history of CALFED.

Table A-7.2: Evolution of Governance Structure- the California Bay-Delta Program Timeline

Date	California Bay-Delta Conservation Initiative/Milestone	Description/Implications
1989, 1993	2 species listed under ESA	Winter-run Chinook salmon and the delta smelt, prompting the involvement of two ESA-enforcing federal agencies: USFWS and NMFS.
1992	Central Valley Project Improvement Act (CVPIA)	Signed into law by President George H. W. Bush, adding fish and wildlife protections, water transfer facilitation, and several environmental requirements to CVP's responsibilities.
1993	Federal Ecosystem Directorate**,** "Agreement for Coordination on California Bay/Delta Issues"	Four federal agencies (NMFS, EPA, USFWS and BoR) committed to collaborating on Delta issues and taking an ecosystem approach. This Directorate is also known as "Club Fed".
1994	"Principles for Agreement on Delta Standards between the State of California and the Federal Government" (the Delta-Bay Accord, or the Accord)	Federal and State administrators signed an agreement to collaborate on management decisions in the Bay-Delta, including an agreement on broad-based water quality standards (The Accord). A major milestone, marking the shift from a conflict-based approach to a collaborative approach. Participants began planning for a long-term California Bay-Delta Program, which later became CALFED.

Date	California Bay-Delta Conservation Initiative/Milestone	Description/Implications
2000	ROD and associated Action Plan	The ROD was a formally adopted federal-state document providing a framework (roadmap) for processes and implementation of the future CALFED program.
2002	California Bay-Delta Authority Act, created The Authority	Also known as "The Authority" or "CALFED", a cooperative of 21 state and federal agencies, responsible for Bay-Delta project oversight, with an integrated approach to addressing: • Ecosystem restoration • Water supply reliability • Water quality • Levee system integrity
2005	Critical review of CALFED by CA Governor found lack of leadership, diminished cooperation, increased litigation	
2007	California Governor's Executive Order S-17-06	Ordered the creation of a "durable vision" for the Bay-Delta by 2008. A task force was assigned to create "DELTA VISION" to correct issues of fragmentation, litigation, lack of clear leadership, and environmental decline that plagued CALFED, to Broaden the Bay-Delta Program focus, and to address aging levees, climate change, and seismic effects, among other issues.
2008	Delta Vision Strategic Plan and recommendations for long-term, sustainable Bay-Delta management.	Delta Vision Strategic Plan abolished the CALFED Authority, but retained useful aspects of CALFED-related sub-organizations, committees, and structured agreements.
2008-present	Development of the Bay-Delta Conservation Plan (BDCP)	Federal and state and local agencies and conservation organizations are still working to achieve broad goals outlined in the Delta Vision Strategic Plan, and to develop a longer-term conservation plan, the BDCP. A draft BDCP and accompanying EIS are anticipated in 2011.

Progress:

In light of CALFED's failure to adequately address endangered species issues and Delta Vision's as yet untried approach, it is important to consider whether such a collaborative, landscape scale program is appropriate or possible given the various challenges present. John Echeverria (2001) suggested that the original decisions to collaborate on both CALFED and the Platte River program were the result of a political hostility to the ESA at the time. Echeverria stated that the collaborative ROD provided water users with 1) greater control over the plan, 2) increased likelihood that mitigation would be equitably shared, and 3) increased likelihood that federal dollars would help pay for mitigation measures. It also served Department of Interior's purposes to make the legislation look more flexible and less onerous to the opposition (Echeverria 2001). In another review of the CALFED and Platte River programs Aiken (1989) described both programs as basinwide settlements between water-rights

and endangered species habitat. These are very serious considerations as government legislation, ESA and CWA, are the main drivers for these costly and time consuming efforts.

Funding Summary:

The EPA, USACE, and BOR were the largest federal contributors to CALFED projects. Federal funds were appropriations based, with funding levels set in the CALFED Bay-Delta Authorization Act of 2004.

CALFED was largely a state funded initiative through both state legislative appropriations and general fund-supported revenue bonds. The heavy reliance on bond funding and the way in which these funds were procured makes CALFED's approach to funding somewhat unusual. As the program was developed through agency action, debate on what would be funded and at what level occurred among agencies and stakeholders. Only after consensus emerged were state legislators approached for funding or authorization. In some instances a bond would be placed directly on a ballot with the support of farmers, water agencies, and environmentalists but without the knowledge of the legislators. These methods resulted in substantial funding for a time, as legislators had little choice but to agree. However, this process threatened the traditional funding mechanisms that were comfortable to Congress and legislators. The process asked them to approve and fund an entire plan as opposed to certain agreeable components. This was difficult as many legislators are unfamiliar with issues outside of their jurisdiction and do not have the time or staff to catch up (Doyle & Drew 2008).

Bond funding provided a good source of "start-up" funding for CALFED, but could not sustainably support a long-term project of this scale. State bonds generated substantial revenue between 2000 and 2005, but bond funding weakened in 2005. It is unlikely that wide-scale support of bond funding will return as bonds cost more money than they generate. For example, from 2000 to 2009, California received $13 billion for water projects that will ultimately cost $23.9 billion. This cost is negatively affecting the public's willingness to approve bond funding in the future.

The weakening bond funding in 2005 prompted Governor Schwarzenegger to call for a long-term financial plan for CALFED (Doyle & Drew 2008). The resulting report was very critical of CALFED's current funding practices and postulated that a *beneficiaries pay* (payment for ecosystem services) plan could potentially fund the program (CLAO 2005). Despite this interest in a new funding mechanism, CALFED continued to operate via general purpose bonds and "without a long-term financing plan" (CLAO 2009:14). CALFED had planned to rely on significant state and federal funds that never materialized; the plan could not be implemented, lost credibility, and ultimately failed. The lesson that Nelson drew from this is: "CALFED failure taught us the danger of relying on public funds" (2010).

Following the dissolution of CALFED in 2008, Delta Vision began its strategic planning. The Delta Vision program has not yet quantified the costs of its implementation. Estimates for the next 10 to 15 years could range from $12 billion to $24 billion with a high estimate of $80 billion. Delta Vision's Strategic Plan identifies bond funds and water contractor willingness to pay for alternative water conveyance as sources for some of

these funds. But it is acknowledged that they fall far short of the goal. The Strategic Plan's Actions 7.3.1 – 7.3.3 suggested solutions to find additional funds (Isenberg et al. 2008b).

- Action 7.3.1 calls for the following design principles to support sustainable funding: 1) create multiple revenue streams, 2) identify beneficiaries, 3) allocate funds consistently, 4) prevent funds from diversion in tight budget years, 5) do not create the expectation of public payment for ecosystem water requirements, 6) ensure project compliance with state and Bay-Delta laws and policies, and 7) create a method to withhold funds if such laws and policies are violated (Isenberg et al. 2008b).

- Action 7.3.2 of Delta Vision's Strategic Plan calls for the establishment of revenue systems outside of the State General Fund using the following methods: 1) levy a per-acre-foot fee on Delta watershed water diversions and a separate fee on water conveyed through or around the Delta, 2) use tough enforcement to ensure all funds are dedicated to the Delta Vision Plan and cannot be diverted, 3) require compliance with the Delta Vision Plan for bonds and financing mechanisms, and 4) require localities to create a localized financial plan. Additionally, action 7.3.3 calls for new revenue sources beyond traditional bond funds or public allocations. The plan identified three potential revenue generating methods: 1) mitigation and conservation banking, 2) sequestering carbon and reducing carbon emissions, and 3) and private, voluntary contributions (Isenberg et al. 2008b).

More recently the California Natural Resources Agency (CNRA) has collaborated with agencies and stakeholders to develop a long-term Bay Delta Conservation Plan (BDCP). The capital costs to implement BDCP projects over the next 50 years are estimated at $16.3 billion, but information on funding sources is still preliminary. Some of the potential funding sources identified include urban and agricultural water user fees, state and federal appropriations, and a "2012 Water Bond" (State of California 2010).

Table A-7.3 provides a summary of the primary CALFED governance structures, the components of the collaboration, their funding sources. Table A.7-3 also provides an assessment of the significance and reliability of the funding sources.

Table A-7.3: Summary of California Bay-Delta Restoration Governance Structure & Funding Sources

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
OVERALL – CALFED Bay-Delta Program				
Model 2. Federal, State Collaboration	Formalized Network - Failed due to lack of leadership (enforcement power), poor governance structure, lack of priorities, and lack of monitoring and accountability Statute of Authority - ESA, with the USFWS regularly reviewing progress; CWA	Some annual federal appropriations	Low	Low
		Majority California state bond funding	Moderate	Low
CALFED Authority				
Model 2. New Organization	Second-order organization (the Authority) - Neither merely a coordinating body nor a super-agency it was created as a compromise to oversee fed and state agencies by approving work plans and conducting annual reviews but without authority over them. It did not work as agencies resented the oversight and the Authority had no decision making authority and thus was an ineffective leader. Statue of Authority - Compromise between CALFED members	Some annual federal appropriations	Low	Low
		Majority California state bond funding	Moderate	Low
Federal Agencies				
Model 4. Existing Agencies	Increased Capacity in Existing agencies - EPA, ACE, and BOR Statute of Authority - ESA, with the USFWS regularly reviewing progress	Appropriations	Low	Low
State of California				
Model 4. Existing Agencies	Increase Capacity in Existing Agencies – Statute of Authority - ESA, with the USFWS regularly reviewing progress	State General Bond	Moderate	Low
Local Governments				

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
Unknown	Likely existing agencies. The local component of this collaboration is not highly developed	Unknown sources for local matching to state and federal grants	Unknown	Unknown
New Governance Structure - OVERALL – Delta Vision & Bay Delta Conservation Plan				
Model 1. Federal, State Collaboration with an increasing local presence	Governance structure beyond general collaboration unclear Statute of Authority - ESA, with the USFWS regularly reviewing progress; CWA	Funded by the Harbor Maintenance Tax (Ad Valorem tax) at 0.125% of cargo value or cruise ship passage tickets. Funds are deposited into the Harbor Maintenance Trust Fund from which Congress appropriates funds for harbor O&M purposes, principally through the Army Corps of Engineers.	High	Low
		Suggested but not yet implemented mechanisms include:		
		Water diversion fee	Moderate	High
		Urban and agriculture Water user fees	Moderate	High
		Urban and agriculture Water user fees	Moderate	High
		Mitigation and conservation banking	Unknown	Unknown
		Carbon sequestering	Unknown	Unknown
		Unknown, suggestions for Delta Vision include: Water diversion fee	Moderate	High

Suggested Applicability to the Colorado River Basin:

Some of the primary conservation challenges shared by the California Bay-Delta and the CRB are: an over-allocation of water, water quality, and declining ecosystem health of critical habitats. ESA-listed species are present in both systems, and both systems are host to an array of regulatory drivers and agencies responsible for regulatory enforcement.

At the southern end of the California Bay-Delta, large pumping facilities move more than 5 million acre feet of water to cities to the south, and to San Joaquin Valley farms - over 7 million acres of the most highly productive agricultural land in the world (Nawi and Brandt, in Doyle and

Drew 2008). Agriculture in the San Joaquin valley is also supported by water diverted from the Colorado River. Thus, water management and allocation decisions within the California Bay-Delta system indirectly affect the CRB, and vice versa. The cautionary tale of California Bay-Delta's struggle to correctly identify adequate leadership, to design an appropriate governance structure, or to secure sustainable funding sources and its periodic increases in litigation could be very informative to a CRB effort. Below, several such lessons are discussed:

- Many that have studied and critiqued CALFED cited an inadequate governance structure as a major factor in the effort's ultimate failure. This emphasizes the importance of carefully considering options and crafting a well-designed governance structure for the CRB. Specifically:
    - Defining leadership roles (including decision making authority) between various agencies (especially between the state and federal governments) might have greatly reduced CALFED's issues with fragmentation and litigation. Thus, clear, well-defined leadership with decision making authority is critical.
    - It also seems as though there was a lack of trust in CALFED due to the large amount of litigation involved and because the agencies did not want to grant the CALFED Authority any regulation power but interests outside of CALFED were concerned that the agencies would not follow the original management plan. Involving these "other interests" such as local agencies, environmental groups, and other non-governmental organizations at an early stage in the process could have helped to build such critical trust.
- The Principle of Balanced Implementation, which is to approach all goals concurrently and to distribute funds fairly, does not support environmental progress on the ground. It is necessary to prioritize actions to achieve results. This is the approach that Delta Vision seems to be taking.
- Bond funding is not appropriate for long-term financial security and will not be supported by the public over time. There is also a possibility that this publicly funded financial mechanism contributed to the use of the principle of balanced implementation in order to ensure all that were paying say benefit locally. This contributed to the lack of environmental progress however. In such an enormous, landscape scale restoration initiative, prioritization is absolutely necessary.
- If goals are not being met and the ecosystem continues to decline support for an effort will flag.
- Be aware of the potential for collaborative efforts to weaken regulatory requirements.

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Appendix A-8: Platte River

Model 1. Inter-organizational Network (committee led federal, multi-state, and private cooperative network)

Governance Structure Summary:

Table A-8.1 provides an overview of the location, stakeholders and governmental agencies and legal framework influencing the Platte River.

Table A-8.1: Platte River Basin Program- General Information

Location/Jurisdiction	Nebraska, Colorado, Wyoming
Non-Governmental Stakeholders	Water providers, environmental organizations concerned with ESA-listed wildlife species (Audubon, National Wildlife Federation, Whooping Crane Maintenance Trust, Environmental Defense)
Government Agencies Involved	Department of interior: i.e. USFWS and BOR
Underlying Drivers of Degradation	Intensive water utilization by agriculture, municipalities, and industry- resulting in insufficient flows for both consumptive water use and water needs of the natural system. Dams and reservoirs changed flow regimes, resulting in loss of critical wildlife habitat.
Statutory Authority	Endangered Species Act
Legal and Policy Considerations	Prior-appropriation water doctrine, ESA Section 7 consultation process, which requires an environmental impact statement (EIS) as mandated by NEPA. Also: Federal Energy Regulatory Commission (FERC)
Legislation	• Consolidated Natural Resources Act (2008) pledged federal share of funding for the Platte River Program. Sponsors included: Senators Ben Nelson, Wayne Allard, Chuck Hagel, Ken Salazar • Colorado's Species Conservation Trust Fund, House Bill 98-1006 • Colorado's Senate Bill 168, authorizing CO DNR to use Species Conservation Trust Fund dollars for the Platte River Program

The Platte River is intercepted by fifteen major dams and their reservoirs as well as by numerous smaller projects serving agricultural and municipal needs. As a result of these river manipulations, nine species, including the whooping crane, interior least tern, and pallid sturgeon are now on the endangered species list and the piping plover is listed as threatened (USGS 2006; Freeman 2008). Due to these designations, the ESA has curtailed water projects on the North, South, and Central Platte Rivers since the late 1970s (Echeverria 2001; Freeman 2008).

To deal with this curtailment the USFWS and BOR initiated a Platte River Management Joint Study in 1983. They were joined by the three basin states - Nebraska, Colorado, and Wyoming - in 1984. After a decade of negotiations, the Joint Management Study Committee put forward a preliminary plan in 1993. This plan laid out methods for acquiring land for conservation, making water available to that land, conducting research, monitoring results, creating a preliminary budget, suggested funding sources, and created a governance structure (Freeman 2008).

At the same time, the USFWS was working to develop instream flow recommendations to support species recovery. These concluded in 1994 and found that to meet habitat requirements an additional 40% (417,000 acre feet) of the average current flow would be needed and 29,000 acres of land would need to be purchased (Echeverria 2001). In the face of these overwhelming numbers, the three states and the BOR agreed to collaborate with the USFWS collectively instead of facing individual evaluations (Echeverria 2001; Freeman 2008). Thus, in 1994, they signed a Memorandum of Agreement (MOA) that established the Central Platte River Basin Endangered Species Recovery Implementation Program (Echeverria 2001). Under this MOA the parties agreed to develop and implement a habitat recovery program while enabling Central Platte water users to continue with existing and new projects in exchange for a suspension of ESA's jeopardy related penalties (Freeman 2008).

Table A-8.2 provides a chronological representation of the milestone events that make up the history of the Platte River.

Table A-8.2: Platte River Program Timeline

Date	Platte River Conservation Initiative/Milestone	Description/Implications
1978	Designation of Big Bend as critical habitat	USFWS designated 51 miles of the central Platte River (known as Big Bend) as critical habitat for the recovery of 3 endangered and 1 threatened species.
1983- 1993	Initial Effort: Platte River Management Joint Study	Confrontation between water providers and USFWS (fulfilling ESA requirements for listed species with critical habitat on the Platte) led BOR and USFWS regional directors to initiate the Platte River Management Joint Study. Ten-years of effort generated a preliminary outline for acquiring habitat and identifying how water could be made available for that land, including: • Research and monitoring plan • Proposed budget • Possible sources of funding • Proposed system for representative governance
1994	Memorandum of Understanding: Initiation of negotiations for development of a Central Platte Basin-wide Collaborative program	Spurred by USFWS instream flow recommendations released in 1994 (requiring 40% of the average current flow, plus 29,000 acres of quality habitat to fulfill habitat needs of listed species), states and water providers agreed to work with the federal government to negotiate the Central Platte basinwide collaborative program. This allowed lengthy ESA processes with each individual water user
1997	Platte River Cooperative Agreement (CA)	All parties agree to work on crafting a plan for collaborative research and monitoring for 13 years- an adaptive management approach which allowed states and water providers to reject the federal target flows analysis, while meeting federal water objectives incrementally. The Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered

Date	Platte River Conservation Initiative/Milestone	Description/Implications
		Species Habitats along the Central Platte River, Nebraska was signed by the Secretary of the Interior, and the governors of Colorado, Wyoming, and Nebraska. Cooperative Agreement's preliminary proposals include • Clear water releases from reservoirs to create habitat • Federal government responsible for 50% of the overall project funding ($157 million), and the 3 states responsible for the remaining 50% (Freeman 2008)
2000	Federal EIS team analysis of CA proposed action plan	Three years of progress made on identifying sources of water and land to meet habitat requirements, when the federal EIS team found that the proposed water action plan in the CA could not serve as an ESA-required "reasonable and prudent alternative". This was because the damn released water was sediment starved and would further incise channels as opposed to depositing sediments and creating habitat.
2006	Platte River Recovery Implementation Program, ESA compliant	Participants re-trenched, planning re-commenced. Negotiators for DOI, the three states, and environmentalists produced the Platte River Recovery Implementation Program plan in 2005, and a *non-jeopardy* biological opinion was obtained in 2006.
2007	Start of Programs' first 13-year increment	The Platte River Recovery Implementation Program long-term goal is to improve and maintain critical habitat while ensuring that basin water projects proceed in compliance with the program's ESA approval. The Program will be implemented by a Governance Committee composed of federal, state, water provider, and environmental groups, advised by several independent technical committees.
2008	Consolidated Natural Resources Act of 2008	Signed into law in 2008, this Act pledged to implement the federal share of the Platte River Recovery Implementation Program.

Progress:

The USFWS had based its suspension of jeopardy opinion on the assumption that the aforementioned increases in-flows and land acquisitions would occur. The water users would not agree to this. Eventually, the parties agreed to an adaptive management approach as part of the *1997 Cooperative Agreement for Platte River Research and Other Efforts Relating to Endangered Species Habitats along the Central Platte River, Nebraska* (Freeman 2008). The system of governance and management created can be categorized as a **committee led federal, multi-state, and private cooperative network (Model 1)**. "Cooperative" was chosen as a descriptor instead of partnership because the effort never mentions the term partnership, which carries with it strong connotations, and it operates under a cooperative agreement.

The Cooperate Agreement allowed the basin states to provide a fraction of the needed annual flow recommendations (11% of flows and 34% of land purchases) as an incremental measure during the first 13 years of the basinwide recovery program. The results of these measures are to be tracked, and the issues revisited at another time. A huge point of contention in this decision for water users, who wanted more certainty, was the determination that if these adaptive management milestones were not met, the USFWS could reopen biological opinions and withdraw jeopardy relief (Freeman 2008).

In all three federal court decisions involving ESA interaction with water rights, significant water rights were stymied or completely forfeited to protect endangered species (Aiken 1989). This court record implies that existing federal regulations could have produced more favorable environmental results if the consensus process was not already in place.

Though the Agreement did succeed in creating broad outlines for a species recovery plan it was essentially a mechanism to eventually develop a basinwide recovery plan (Echeverria 2001; USFWS 2006). In the process of developing the actual plan, in 2000 the USFWS Environmental Impact Statement evaluation of the Cooperative Agreement's preliminary proposals found that the plan to release water to create habitat was not a "reasonable and prudent alternative" (Freeman 2008:77). This was due to new models showing that releasing higher flows of sediment starved, reservoir water would actually serve to further incise channels instead of widening them. As a result of this complication, negotiations were incrementally extended (Freeman 2008).

During further negotiations, states pushed for defined habitat contributions. In contrast, the USFWS wanted to emulate natural flows in the system using adaptive management which would allow more flexibility and uncertainty. This discussion continued until December 31, 2006, when a decision was essential as it was feared that the Department of Interior would pull out of the process and commence individual ESA compliance work, funds were running out, and it was a national election year. Thus, progress continued when it was agreed that regulatory enforcement would be enacted only if water users failed to reach activity based milestones and not those based on actual habitat recovery (Freeman 2008).

In 2006 a non-jeopardy biological opinion was secured for the Platte River Recovery Implementation Program. The Program's first thirteen year increment began on January 1, 2007 (Doyle & Drew 2008). A Governance Committee representing the federal, state, water, and environmental groups involved in the process will implement the Program. The Governance Committee will be advised by water, land, technical and independent science advisory committees. Meanwhile the FWS will regularly review the progress of all water related actions (USFWS 2006).

The most significant progress to date is the creation of the Platte River Recovery Implementation Program's first thirteen year increment plan in 2007 and the signing of the program into law in 2008. Required actions mainly consist of purchasing land and water from willing sellers, restoring and managing lands, and monitoring and research of progress (USFWS 2006). There is no readily accessible information on the progress made towards the Program's goals.

Echeverria (2001) felt that the original decision to collaborate on the California Bay-Delta as well as the Platte River program was a result of a political hostility to the ESA at the time. In this environment the DOI was facing a great deal of pressure to create a solution that Platte River water users would support. Echeverria stated, "The basic purpose of the Platte River process was to ratchet down the burden on water users because of ESA needs. The potential for accelerated losses of wildlife and wildlife habitat was, at best, a secondary consideration (2001:568)." Interestingly, Echeverria also stated that the Platte river collaboration was modeled after the Bay-Delta and the upper Colorado River Basin endangered fish plan (2001).

Echeverria (2001:568) continued by stating that the MOA was a comfort to water users because it: 1) increased their ability to control the outcome of the proposed plan; 2) increased the likelihood that mitigation efforts would be equitably shared amongst the water projects; and 3) increased the opportunity to receive federal taxpayer dollars for mitigation efforts. It also served the political purposes of the Department of Interior by demonstrating "flexibility inherent in the ESA".

All of these political and "parochial" economic benefits were gained to the detriment of ecologically driven actions and results (Echeverria 2001:560). In addition, the collaborative process essentially derailed progress on two projects hailed as promising by environmentalists. The Central Nebraska Public Power and Irrigation District (Central) and the Nebraska Public Power District (NPPD) were both up for relicensing under the Federal Power Act (FPA) and were subject to ESA requirements. The MOA essentially took over this process, ostensibly weakening its potential for meaningful action (Echeverria 2001).

It is difficult to determine whether the benefits of a collaborative process outweigh such costs. Doyle and Drew (2008) postulate that such collaborations, once established, are better able to withstand difficult political climates over the long term.

Funding Summary:

The Platte River Cooperative Agreement of 1997 laid out guidelines for funding responsibilities. The states (Colorado, Nebraska, and Wyoming, collectively) and the federal government were each set to provide 50% of overall project costs, or $157 million each, over time. The Consolidated Natural Resources Act, signed into law in 2008, pledged to implement the federal share of the Platte River Program, authorizing $157 million in appropriations over time. President Obama's Fiscal Year 2010 budget request for the Platte River Program is $12 million (BOR 2011).

The states have the option of making monetary or in-kind contributions. Colorado will contribute $20 million and administer the Tamarack Phase I Water Project. Wyoming will provide $6 million and administer the Pathfinder Modification Project. Nebraska will have no monetary commitment, since its land and water contributions are sufficient. In order to meet its monetary obligation, Colorado will use its Conservation Trust Fund, created by House Bill 98-1006 in 1998. The Fund was initially capitalized with $5.1 million from the State's Capital Construction Fund (Colorado State 1998). Additional contributions to the Conservation Trust Fund include transfers from the state's Severance Tax Trust Fund.

Another source of support comes from membership fees paid by water users to the South Platte Water Related Activities Program, Inc. (SPWRAP). This non-profit corporation was formed by Colorado water users to support Colorado in implementing the Platte River Program and to gain representation on the Governance Committee for its members (SPWRAP 2010).

Table A-8.3 provides a summary of the primary governance structures in the Platte River Basin and their funding sources.

Table A-8.3: Summary of Platte River Basin Restoration Governance Structure & Funding Sources

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
OVERALL – Platte River Recovery Implementation Program				
Model 1. Federal, Multi- State, and private cooperative	Network of Existing Agencies - federal, state, and private (water providers and environmental groups) organizations that have agreed to cooperate to streamline ESA requirements Statute of Authority - ESA, with the USFWS regularly reviewing progress	Platte River Recovery Implementation Program Funding (federal appropriations): Federal: 50% ($157 million) Three states: 50% ($157 million)	High	Moderate
Governance Committee				
Model 2.Federal, Multi- State, and private Committee	Second-order organization – this committee, with federal, state, and private (water providers and environmental groups) representation, will implement the Platte River Program, with input from independent technical and science advisory committees Statute of Authority - ESA, with the USFWS regularly reviewing progress	Platte River Recovery Implementation Program Funding (federal appropriations): Federal: 50% ($157 million) Three states: 50% ($157 million)	High	Moderate
Federal Leadership/ Management/ Implementation				
Model 4. Existing Agencies	Increase capacity in existing organizations – DOI (i.e. USFWS and BOR) Statute of Authority – ESA	Consolidated Natural Resources Act of 2008: $157 million over time.	High	Moderate

Governance Structure	Description of Governance Structure & Statute of Authority	Funding Mechanism	Assessment of Funding Mechanism	
			Significance	Reliability
State Implementation - CO				
Model 4. Existing Agencies	Increase capacity in existing organizations - Colorado Statute of Authority - ESA	$20 million + in-kind water project funded through CO Species Conservation Trust Fund (contributions from Capital Construction Fund + Severance Tax Trust Fund): Authorized to spend $7.585 million on the Platte & SPWRAP (described below)	High	High
State Implementation - NE				
Model 4.Existing Agencies	Increase capacity in existing organizations - Nebraska Statute of Authority - ESA	In-kind land and water contributions provided by Central Nebraska Public Power and Irrigation District, and the Nebraska Public Power District	Moderate	Moderate
State Implementation - WY				
Model 4. Existing Agencies	Increase capacity in existing organizations - Wyoming Statute of Authority - ESA	$6 million + in-kind water project - Unclear how WY will meet their monetary/in-kind obligations	Moderate	Moderate
South Platte Water Related Activities Program - Colorado				
Model 2. Non-Governmental Organization	Second-order organization – Colorado water users participate in exchange for representation on the Governance Committee Statute of Authority - ESA	Membership fees paid by Colorado water users, in exchange for representation on Governance Committee, and addressing water user's ESA responsibilities through the Platte River Program. Estimated at $821,000 in 2008.	Moderate	Moderate

Suggested Applicability to the Colorado River Basin:

The primary conservation challenge on the Platte River is to balance human demands for water with wildlife water needs as required by the ESA. Similar challenges are present in the CRB, where demand for water exceeds supply and several ESA-listed species are present. Further, altered flow regimes and decreased sediment loads created by dams and reservoirs negatively impact critical wildlife habitat on both river systems. Finally, two of the three states involved in the Platte River Recovery Implementation Program are also part of the CRB (Colorado and Wyoming). Thus, many lessons can be learned from these state's participation in nearly two decades of planning and negotiations on Platte River Basin conservation initiatives.

- Water users are willing to enter into a cooperative agreement process to collectively reach a solution than undergo ESA processes separately. Such collaboration can foster innovative funding mechanisms. For example, a non-profit corporation such as Colorado's South Platte Water Related Activities Program (which generates funds from Platte River Basin water users' membership dues) could serve as a template for forming a similar organization within the CRB. However, some would argue that this cost is minimal when considering the fact that water users are liable for costs associated with ESA requirements.
- The collaborative process may also have the potential to weaken ESA requirements as the U.S. Fish and Wildlife recommended flows were decreased, with a plan to gradually ramp them up to required levels, as a result of negotiations. It is important to be aware of the potential for collaborative efforts to weaken regulatory requirements.

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Appendix B: Smaller-Scale, Tributary-Level Restoration Initiatives within the CRB

The purposes of *Watershed Governance Structure and Funding* are 1) to inform a discussion of governance structures that may be appropriate to manage a Colorado River Basin Restoration (CRB) Initiative and, *2) to inform governance structure discussions for Colorado River tributary restoration initiatives*, given their respective political climates and potentially viable funding options.

While no large-scale Colorado River Basin Restoration Initiative exists at present, several tributary-level watershed restoration partnerships have been established on rivers within the CRB and in surrounding regions to address invasive vegetation in riparian areas, the overall health of riparian systems, and in some cases watershed health. Some CRB tributary-level restoration partnerships have survived the initial stages of formation and are actively implementing restoration work on the ground, while others are still in the early stages of formation. CRB tributary-level restoration partnerships are represented in Figure B-1, and Table B-2.

In terms of governance structure, most of these tributary-level partnerships can be categorized as inter-organizational networks. CRB tributary-level initiatives encompass smaller project areas, are directed and implemented by locally-based stakeholders, and work with much smaller budgets than the large-scale case studies presented in Appendix A. However, they do involve collaboration between multiple stakeholder groups, state, and federal agencies, they are influenced by local and regional politics and public perception, they struggle to establish sustainable funding streams, and they are attempting to address some of the same resource challenges threatening riparian and watershed health, ecosystem health, and the quality of life for local inhabitants. Further, tributary-level restoration partnerships offer something that the literature and external case studies cannot: real-time examples of collaborative watershed restoration *within the CRB*. They are smaller-scale, evolving restoration initiatives currently underway, testing and modeling many of the “lessons learned” outlined in this report.

Figure B-1: 2011 Map of Collaborative Restoration Initiatives within the Colorado River Basin

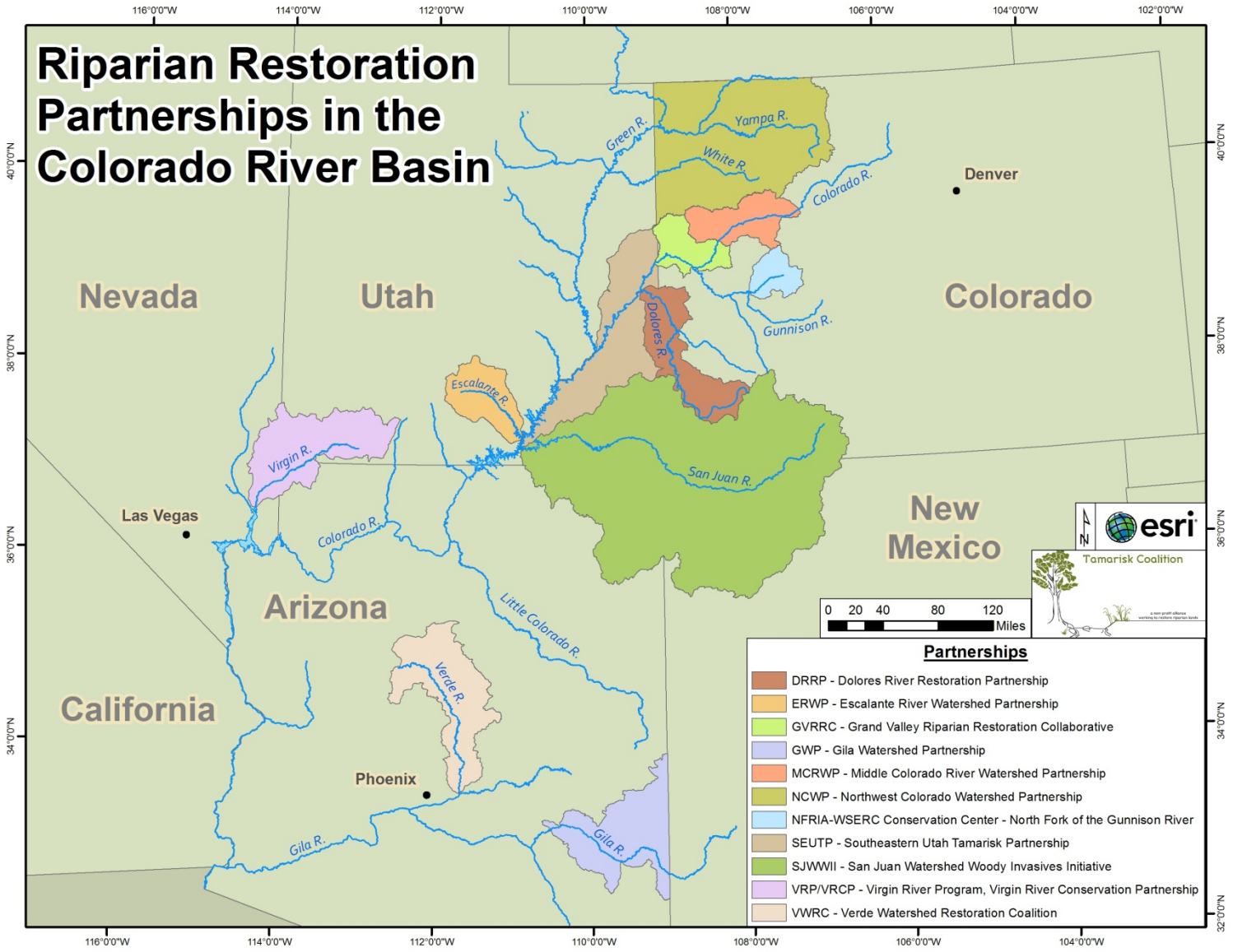

Table B-2: Selected Colorado River Basin tributary-level restoration initiatives.

Restoration Initiative Name	Website
Dolores River Restoration Partnership (DRRP)	http://ocs.fortlewis.edu/drrp/
Escalante River Watershed Partnership (ERWP)	http://www.facebook.com/EscalanteRiverWatershedPartnership
Grand Valley Riparian Restoration Collaborative	None currently available
Gila Watershed Partnership of Arizona	http://gilawatershedpartnership.com/home
Middle Colorado Watershed Partnership (MCRWP)	https://sites.google.com/site/midcoriverpartnership/home
Northwest Colorado Watershed Partnership (NCWP)	None currently available
North Fork of the Gunnison River	http://www.theconservationcenter.org/
San Juan Watershed Woody Invasives Initiative (SJWMI)	http://www.sjwwii.org/
Southeast Utah Riparian Partners (SURP)	http://www.grandcanyontrust.org/utah/invasives_actions_seutp.php
Verde Watershed Restoration Coalition (VWRC)	http://verdewrc.org/VWRC/Welcome.html
Virgin River Program (VRP) Virgin River Conservation Partnership (VRCP)	http://www.virginriverprogram.org/ http://www.mesquitenv.com/GeneralInfo/EnvironmentalVirginRiverAdditionalPageVRCP