BlueCert
Blockchain-Enabled Water Credit Offset Bonds
The Colorado River Basin is really, really important.

- 20% of US GDP supported by Colorado River Basin
- 40M people dependent on the CRB for water
- 4M acres of irrigated agriculture supported by the Colorado River Basin

Source: US Bureau of Reclamation, Colorado River Basin Executive Summary, December 2012
A Critical Resource for the Southwest

Source: US Bureau of Reclamation, December 2012. Since 2003, the demand for surface water has consistently surpassed the naturally available supply and the historical average supply every year.
The Stress Test hydrology scenario omits the earlier part of the natural flow record and concentrates on the more recent hydrology (around 30 years), which has an average flow that is 11% drier than the Full hydrology. The adoption of the Stress Test scenario is backed by numerous research studies, which found a change in temperature patterns in the Colorado River Basin during the late 1980s. This shift impacted runoff efficiency, leading to reduced average flows despite consistent precipitation levels.
### Allocation Cut Trigger Points

<table>
<thead>
<tr>
<th>Elevation</th>
<th>Arizona</th>
<th>Nevada</th>
<th>Mexico</th>
<th>California</th>
</tr>
</thead>
<tbody>
<tr>
<td>1075-1090</td>
<td>192K</td>
<td>8K</td>
<td>41K</td>
<td>0K</td>
</tr>
<tr>
<td>1050-1075</td>
<td>512K</td>
<td>21K</td>
<td>80K</td>
<td>0K</td>
</tr>
<tr>
<td>1045-1050</td>
<td>592K</td>
<td>25K</td>
<td>104K</td>
<td>0K</td>
</tr>
<tr>
<td>1040-1045</td>
<td>640K</td>
<td>27K</td>
<td>146K</td>
<td>20K</td>
</tr>
<tr>
<td>1035-1040</td>
<td>640K</td>
<td>27K</td>
<td>154K</td>
<td>250K</td>
</tr>
<tr>
<td>1030-1035</td>
<td>640K</td>
<td>27K</td>
<td>162K</td>
<td>300K</td>
</tr>
<tr>
<td>1025-1030</td>
<td>640K</td>
<td>27K</td>
<td>171K</td>
<td>350K</td>
</tr>
<tr>
<td>&lt;1025</td>
<td>720K</td>
<td>30K</td>
<td>275K</td>
<td>350K</td>
</tr>
</tbody>
</table>

Source: US Bureau of Reclamation, Lower Colorado River Basin Drought Contingency Plan, 2019
## Impact of Water Cuts

### Economic

<table>
<thead>
<tr>
<th>% Decline in CRB Water</th>
<th>GDP State Impact (US$ Billions)</th>
<th>Employment Impact (Millions)</th>
<th>Labor Income ($B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>143.4</td>
<td>1.6</td>
<td>87.1</td>
</tr>
<tr>
<td>15%</td>
<td>215.1</td>
<td>2.4</td>
<td>130.7</td>
</tr>
<tr>
<td>20%</td>
<td>358.5</td>
<td>4</td>
<td>217.9</td>
</tr>
<tr>
<td>25%</td>
<td>717.1</td>
<td>8</td>
<td>435.7</td>
</tr>
</tbody>
</table>

### Environmental

- Forest Health Issues
- Poor Grassland Health
- Invasive Riparian Vegetation
- Habitat Destruction Due to Channelization
- Invasive/Non-Native Aquatic Species
- Dust on Snow
- Depleted Stream Flow from Groundwater Pumping
- Out-of-Basin Diversions
- Changes in Stream Flow due to Dam Operations
- Changes in Water Temperature
- Shortage Risks Due to Local Runoff Shortfalls
- Shortage Risks due to Structural Deficit
- High Salinity

**Source:** The Economic Importance of the Colorado River to the Basin Region. Tempe: Arizona State University, Dec 2014
Incentivizes water saving

Offers additional monetization

Allows for scale
Incentivizes water saving
Offers additional monetization
Allows for scale
Incentivizes water saving

Offers additional monetization

→ Allows for scale
BlueCert: Flow of Funds

Institutional Investor

Financing Entity

Water Saving Project Borrower

3rd Party Validator

Water Credit Buyers

Interest
Principal
Water Credit

Interest
Principal
Water Credit

split between project & investors

Payment
Water Credit

Validation
Project Data

Background
Problem Statement
BlueCert
Catalysts
Risks | Assumptions
Appendix
Hypothetical Bond Terms & Payoff for Investors

### Hypothetical Terms

<table>
<thead>
<tr>
<th>Term</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Maturity</td>
<td>5 years</td>
</tr>
<tr>
<td>Coupon Rate</td>
<td>5.50%</td>
</tr>
<tr>
<td>Face Value</td>
<td>$10 Million</td>
</tr>
</tbody>
</table>

### Hypothetical Returns at Maturity

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Projected Nominal Bond Return</td>
<td>$12,750,000</td>
</tr>
<tr>
<td>Minimum Water Credit Payout</td>
<td>$163,556</td>
</tr>
<tr>
<td>Projected Bond + Water Credit Return</td>
<td>$12,913,556</td>
</tr>
<tr>
<td>Yield to Maturity Range</td>
<td>5.50% - 5.83%</td>
</tr>
</tbody>
</table>

### Hypothetical Payoff Profile

![Hypothetical Payoff Profile Graph]

- **Return**
  - Water Credit
  - Annual Coupon

- **Year**
  - 0, 1, 2, 3, 4, 5
Farmer A grows in Colorado’s Grand Valley Water Users Association

Farmer A borrows $10 million from BlueCert

After investment in a new sprinkler system, the farmer reduces water usage by 15% by year 3 after the project is completed in year 2

- ~990 water acre feet saved and credits generated
- ~$300k in earnings from water credits split between farmer and investor
Ensuring a uniform validation process is performed for each project is critical for the impact of a water credit to be realized. Unlike a carbon offset credit, water is a more tangible resource to track in terms of flow and volume.

- The project owner will model their water savings when applying for the loan and include how they plan to track progress.
- A 3rd party validator will review the project and suggest additional monitor techniques.
- During the project implementation process the project owner will assess if the current progress is matching their estimates.
- Once the project is completed, the project owner submits test data to the validator to authenticate the generation of a water credit.
Creating a Market for Water Credits

Buyers and sellers of water credits need a place to transact.

- Borrowers generate water credits
- Buyers of water credits, whether for their own use or as an investment, buy credits.
- As credits are bought, sold or retired, a market maker tracks each party’s activities.

Blockchain is one of many mechanisms that can serve as a marketmaker, creating shared record of credit ownership across disparate stakeholders.
The Need for Private Capital

A 4x in federal financial support could boost the industry’s overall funds by approximately 5 percent in the short run; however, this increase would **still leave a 22 percent gap in the required capital**

Source: Congressional Research Service; Global Water Intelligence; Statista; US Environmental Protection Agency
Exponential Growth in Water-Related Transactions

Following a relatively stagnant period of growth between 2012 and 2017 (2 percent), the growth rate of water sector M&A transactions has significantly risen to 16 percent annually. The growth has been particularly driven by PE and infrastructure funds, with their activity experiencing an annual increase of 26 percent during the same timeframe.

Source: Global Water Intelligence’s WaterData market intelligence platform
Risks and Assumptions

Risks

Market Risk
The demand for water credits may not be sufficient to ensure their marketability, which could impact expected returns for investors

Counterparty Risk
Borrowers may default on their obligations, leading to losses for lenders / investors

Verification Risk
The accuracy of third-party verification of water conservation efforts are crucial for the credibility of the financial instrument

Liquidity Risk
The market for water credits may not be sufficiently liquid, making it difficult for holders to sell their water credits at a fair price

Regulatory Risk
Changes in regulations could impact the feasibility or attractiveness of the proposed financial instrument

Mitigation Strategies

Inflation Reduction Act
Government subsidies valuing water savings at a floor of $330 per acre-foot per year

Due Diligence
Credit assessments and due diligence on borrowers, as well as diversification of the lending portfolio

Third-Party Verification and Audits
Third-party verification and audits maintain the integrity of the system; blockchain as a transparent reporting mechanism

Secondary Market Development
Partnership with established exchanges (ex. Morgan Stanley ETrade, NASDAQ Veles) to facilitate water credit trading

Public Private Partnerships
Collaboration with regulatory bodies during the development and implementation of the financial instrument to ensure compliance
Appendix
## Background

### What is blockchain?

A record (‘ledger’) of security ownership that is created, owned and maintained by shared stakeholders.

Traditionally, individuals validate transactions on the chain by ‘mining.’ In the BlueCert model, there will no ‘mining.’ Water credits will be validated by off-chain parties prior to entry onto the chain.

### Why use blockchain for this use case?

1. **Transparency** of ownership
2. **Standardization** across stakeholders
3. **Efficiency** through cross-border ownership
4. **Scalability** beyond the Colorado River Basin

### Who would own and run the blockchain?

We propose a consortium model of ownership. **Owner/Operators** in a consortium model would be participants stakeholders in the river.

Examples would be borrowers, lenders, validators, regulators and governments

### Considerations

1. Energy use of maintaining the blockchain **mitigated** because no ‘miners’ are required to continuously validate transactions on the blockchain
2. Low uptake amongst participants a risk that can be mitigated through other ownership records/non-blockchain technologies
Water Credit Marketplace

Water Credit Lifecycle:
- Once generated, credits can be used to increase water consumption within a year.
- When the credit is used when reporting water consumption for the year, the credit is then retired.
- Retired credits are unable to be used again.

Price and Transfer of a credit:
- 1 water credit is the right to consume 1 acre feet of water.
- The price of the credit will be determined by supply and demand for the credits but have a floor of $330.
- If an owner of a credit does not need it for their own consumption, they can either save it or sell it on an exchange.
- A water user in need of a credit is able to purchase a credit for sale on an exchange to offset their water usage.