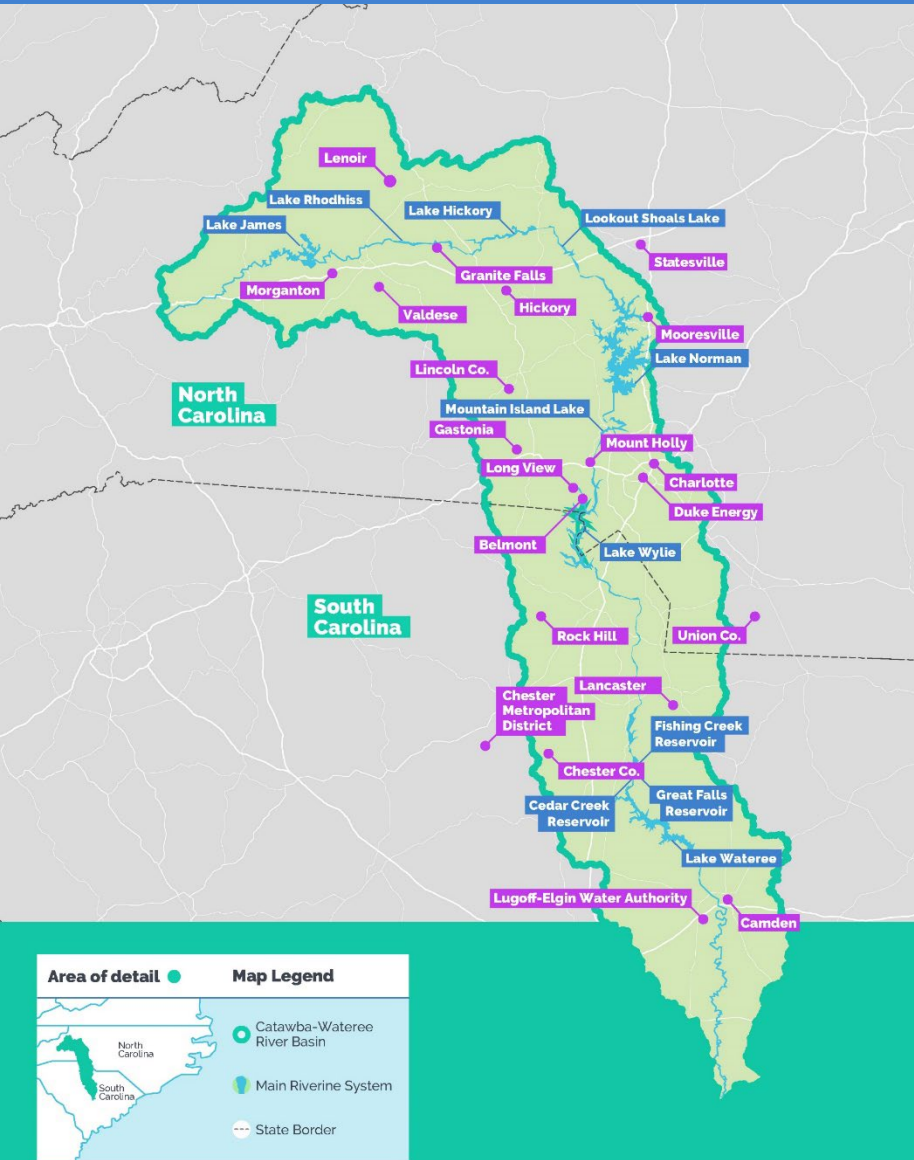


**CATAWBA**  
**WATEREE**  
WATER MANAGEMENT GROUP

**Citizens Water Academy**  
**February 3, 2022**

# The Catawba-Wateree River Basin



- 4,750+ square miles
- Supports nearly two million people with water for drinking, power generation, industrial processes, crop and livestock production, recreation, irrigation, and more
- 2006 Water Supply Study found maximum capacity of Catawba River Basin for water supply could be reached mid-century
- Catawba-Wateree Water Management Group incorporated - December 2007
- Water Supply Master Plan commissioned in 2010
- Purpose of Master Plan is to find ways to extend the time before the capacity of the Basin is reached

# 2014 Water Supply Master Plan (WSMP)

- **Goal:**
  - To extend safe yield capacity beyond the year 2100
- **Plan Elements:**
  - Supplemental funding
  - Stakeholder input
  - Water use projections
  - Refinement of hydrologic model
  - Climate change impacts
  - Develop & evaluate options
  - Action plan and schedule
  - Publish report
  - Implementation, on-going public input
  - Periodic future updates



# Project Funding

Duke Energy Foundation  
North Carolina Department of  
Environment and Natural Resources

South Carolina Department of Natural  
Resources  
Catawba-Wataeree Water  
Management Group



# Stakeholder Advisory Team (SAT)

Advisory level input by key organizations with an interest in future planning efforts for the Basin

Intended to ensure a broad level of input from a diverse group of interested stakeholders

## SAT Member Organizations

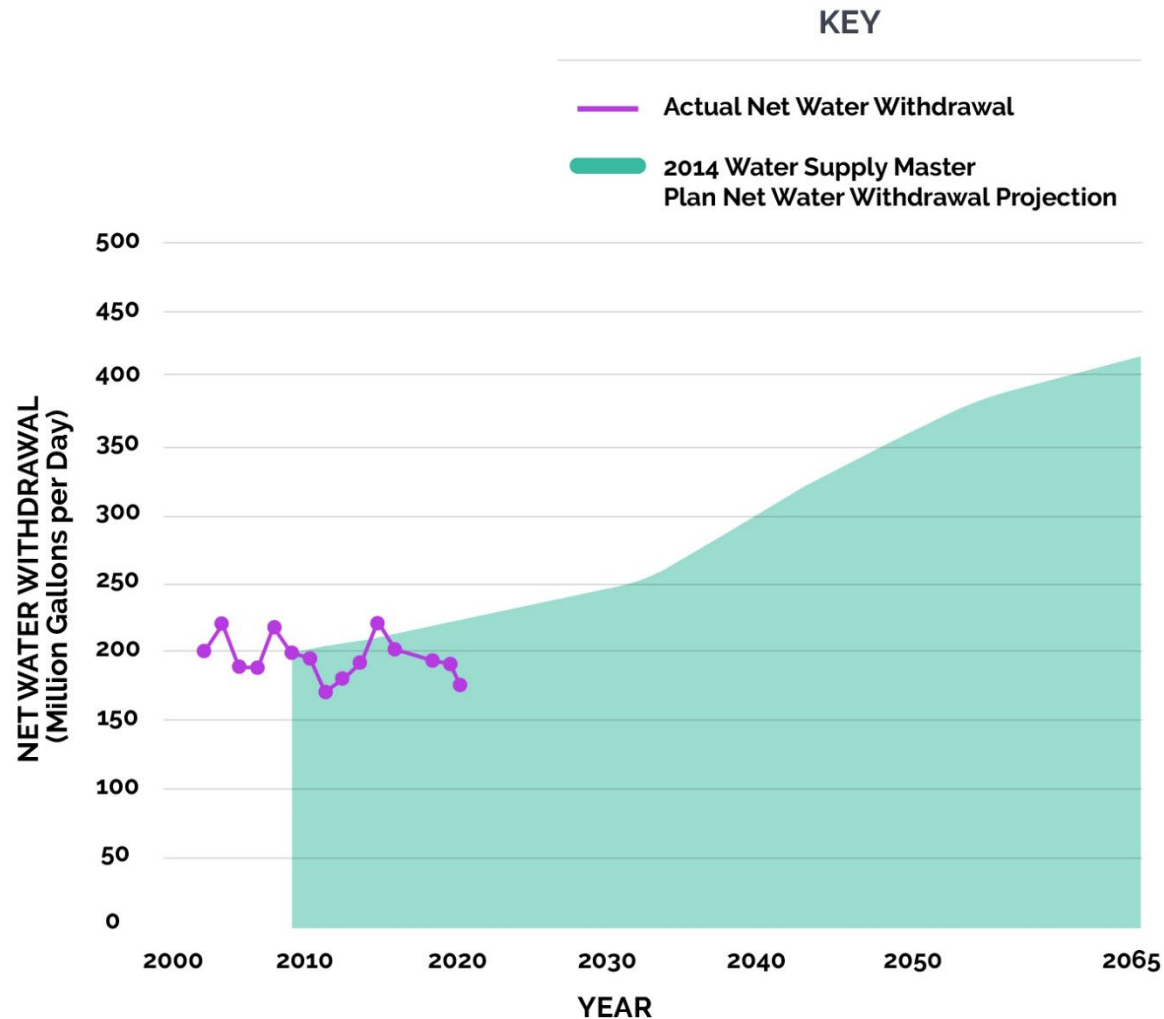
|   |                                       |                          |
|---|---------------------------------------|--------------------------|
| Catawba Regional Council of Governments (COG) | Mt. Island Lake Marine Commission     | The NC Conservation Fund |
| Centralina Regional COG                       | NC Division of Water Resources        | Newton, NC               |
| Western Piedmont Regional COG                 | NC Wildlife Resources Commission      | Kershaw County, SC       |
| Isothermal Regional COG                       | SC Dept. of Health & Env. Control     | Resolute Forest Products |
| Central Midlands COG                          | SC Department of Natural Resources    | International Paper      |
| Lake Norman Marine Commission                 | Catawba Wateree Relicensing Coalition | Siemens Westinghouse     |
| Lake Wylie Marine Commission                  |                                       |                          |

# Projected Annual Average Net Withdrawal Rates by Subbasin (in mgd)

| Reservoir       | Base Year <sup>1</sup> | 2015       | 2025       | 2035       | 2045       | 2055       | 2065       |
|-----------------|------------------------|------------|------------|------------|------------|------------|------------|
| James           | 5                      | 5          | 6          | 6          | 6          | 7          | 7          |
| Rhodhiss        | 14                     | 14         | 15         | 16         | 17         | 18         | 19         |
| Hickory         | 11                     | 12         | 13         | 20         | 22         | 24         | 26         |
| Lookout Shoals  | 3                      | 4          | 5          | 5          | 6          | 7          | 8          |
| Norman          | 61                     | 65         | 74         | 80         | 102        | 112        | 125        |
| Mountain Island | 109                    | 114        | 132        | 153        | 171        | 187        | 205        |
| Wylie           | 44                     | 46         | 43         | 35         | 34         | 34         | 33         |
| Fishing Creek   | -62                    | -69        | -71        | -72        | -78        | -45        | -47        |
| Great Falls     | -1                     | -1         | -1         | -2         | -2         | -3         | -4         |
| Cedar Creek     | -1                     | -1         | -1         | -1         | -1         | -1         | -2         |
| Wateree         | 4                      | 5          | 7          | 8          | 45         | 47         | 49         |
| <b>Total</b>    | <b>189</b>             | <b>195</b> | <b>221</b> | <b>248</b> | <b>323</b> | <b>386</b> | <b>419</b> |

<sup>1</sup> Base Year rates represent data from the most recent available years for which withdrawals and returns were recorded. The most recent year for a given water user typically ranged between 2010 and 2011.

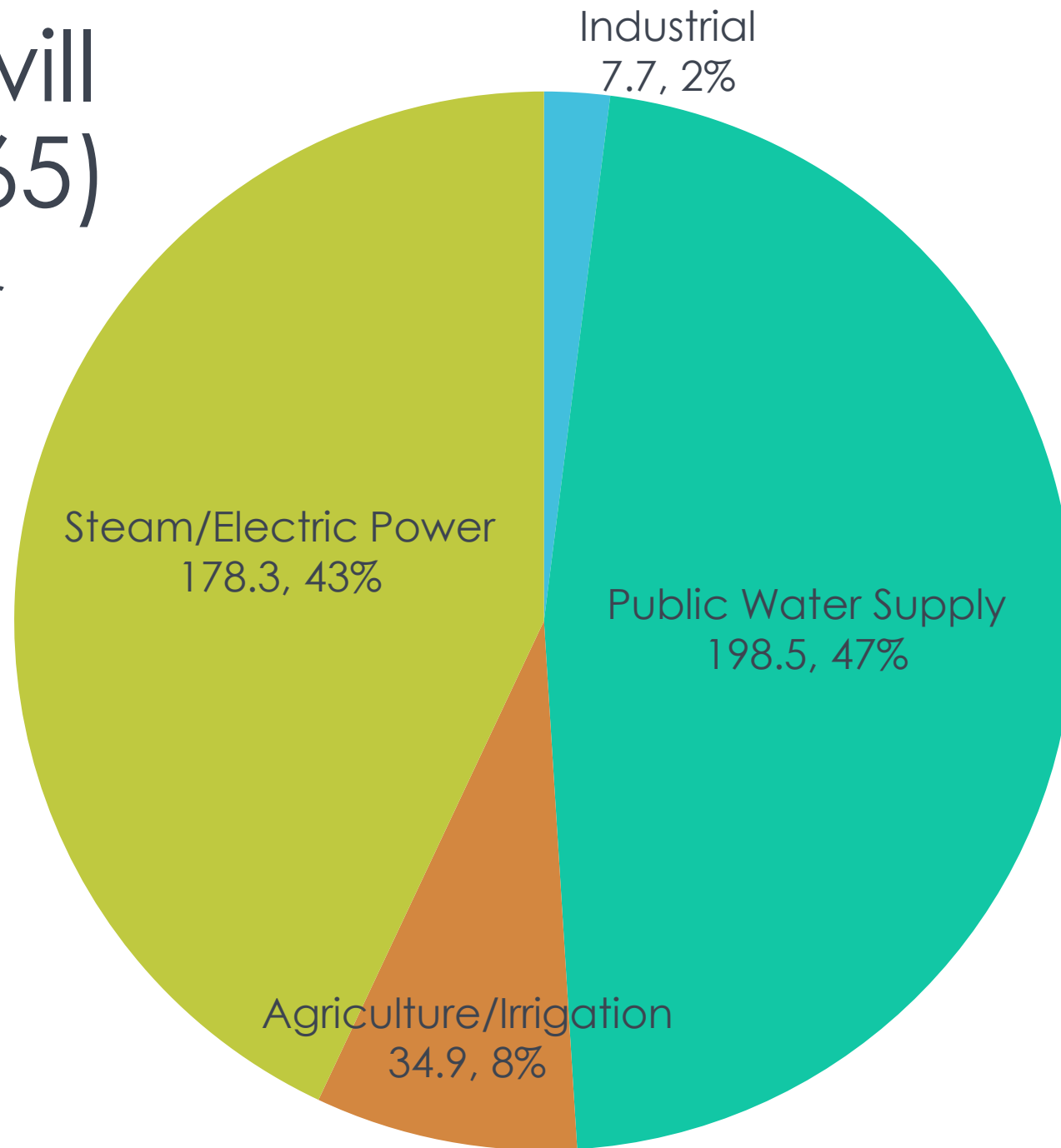
# Projected vs Actual Net Withdrawal



| YEAR | NET WITHDRAWAL |
|------|----------------|
| 2011 | 202            |
| 2012 | 199            |
| 2013 | 175            |
| 2014 | 184            |
| 2015 | 196            |
| 2016 | 224            |
| 2017 | 205            |
| 2018 | 193            |
| 2019 | 197            |
| 2020 | 173            |

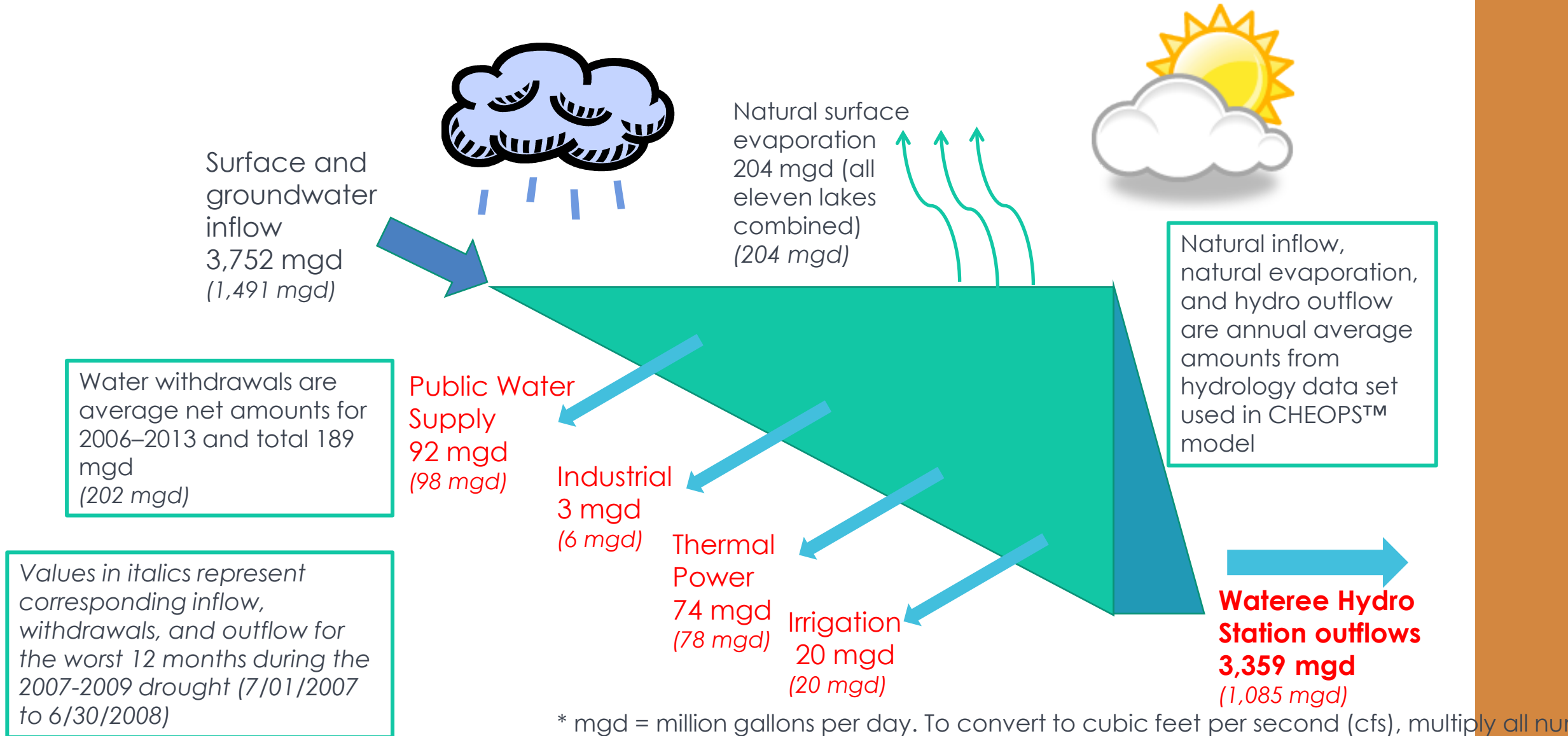
# How Water will be Used (2065)

- Million gallons per day (mgd) consumed and percent of total 419.4 mgd





# CW Reservoir System Water Balance



# Individual and Integrated Future Planning Scenarios

- Baseline
- Population growth
- Climate change
- Public water supplier water use changes (water use efficiency, reroute wastewater)
- Power consumptive water use changes (e.g. relocation of demand)
- New off-stream storage reservoirs
- Critical intake modifications
- Effluent flow recycling
- Modified reservoir operations
- Low Inflow Protocol (drought management plan) modifications

# 2014 WSMP Key Recommendations

Increase water use efficiency

Lower critical water intakes/elevations

- Power plant
- Public water supply

Raise target lake levels on 3 lakes during summer months

Enhance drought responsiveness through Low Inflow Protocol



# Low Inflow Protocol Overview



## Role of the CW-DMAG

- Work with Duke Energy when the Low Inflow Protocol (LIP) initiated
- Meet, as necessary, to foster basin-wide Low Inflow Condition response
- Members must comply with LIP conditions
- Membership open to the following organizations (2 rep's each)
  - NCDEQ (NCDWR)
  - NCWRC
  - SCDNR
  - SCDHEC
  - USFWS
  - NMFS
  - USGS
  - Large Water Intake owners, located on C-W Project Reservoirs or main stem of the river
  - Large Water Intake owners, located on tributary streams within the C-W Basin, draining to Lake Wateree
  - Duke Energy



## CW-DMAG General Responsibilities

- Review and update the LIP periodically to ensure continuous improvement
  - At least once every five (5) years
  - Must be approved by CW-DMAG consensus
- Provide monthly water withdrawal and return data, annually
  - CW-DMAG provides monthly use
  - CWWMG also provides categorical use
- Use the LIP as the basis for their Drought Response Plans or Ordinances
- Take specified LIP measures during drought stages



# CW-DMAG LIP Responsibilities by Stage

- **Normal Conditions**
  - No Action, except General Responsibilities
- **Stage 0 – Low Inflow Watch**
  - Participate in monthly CW-DMAG meetings
- **Stage 1**
  - Notify customers – VOLUNTARY restrictions
  - Two (2) day per week (or less) irrigation
  - Reduce water use 3-5% (or more)
- **Stage 2**
  - Notify customers – MANDATORY restrictions
  - Two (2) day per week (or less) irrigation
  - Reduce water use 5-10% (or more)
- **Stage 3**
  - Notify customers – INCREASED MANDATORY restrictions
  - One (1) day per week (or less) irrigation
  - Reduce water use 10-20% (or more)
- **Stage 4**
  - Notify customers – EMERGENCY restrictions
  - No outdoor water use
  - Reduce water use 20-30% (or more)



## Catawba-Wateree LIP Trigger Status Summary for 01/04/22 and Changes Compared to 12/01/21

|                 | Reservoir Storage as % of Target | % of 6-Month Long-Term Avg Streamflow | 3-Month Avg of US Drought Monitor | C- W Groundwater Network (% of Historic Range)<br><i>For Informational Use Only</i> |
|-----------------|----------------------------------|---------------------------------------|-----------------------------------|---|
| Normal          | <br>>=100%                       | >85%                                  | <0                                |   |
| <br>LIP Stage 0 | >90%                             | <=85%                                 | <br>>=0                           |   |
| LIP Stage 1     | >75%                             | <br><=78%                             | >=1                               |   |
| LIP Stage 2     | >57%                             | <=65%                                 | >=2                               |   |
| LIP Stage 3     | >42%                             | <=55%                                 | >=3                               |   |
| LIP Stage 4     | <=42%                            | <=40%                                 | 4                                 |   |

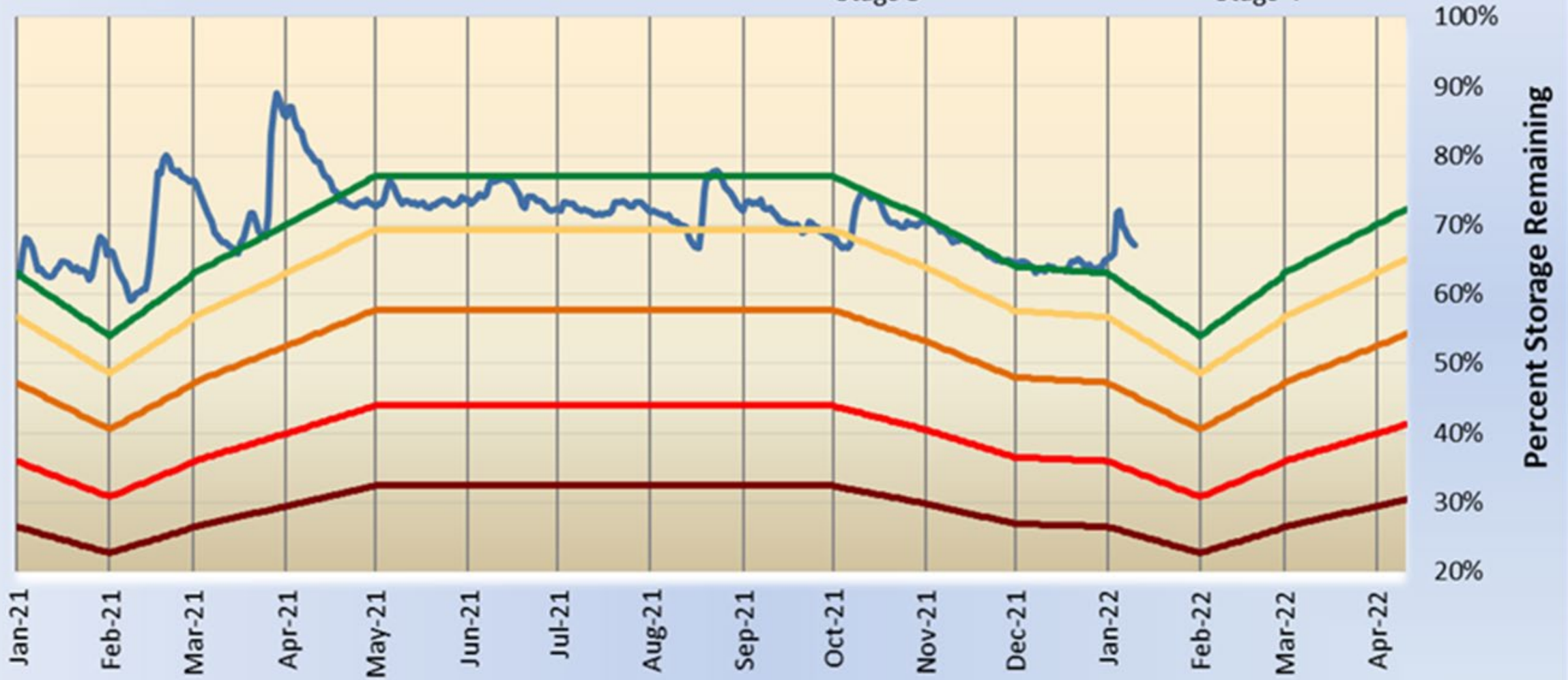
**To recover to a less restrictive LIP Stage the Trigger Indicators above, unless noted otherwise, must support that Stage or lower.**



# Catawba Wateree Storage Index

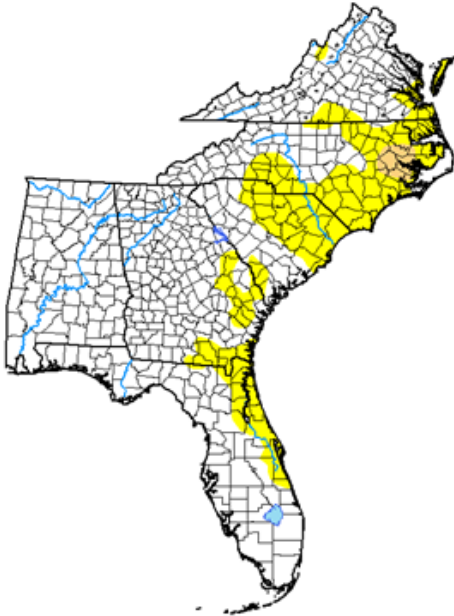
## All Reservoirs Combined

- Actual Storage Index
- Stage 1
- Stage 2
- Stage 3
- Target
- Stage 4

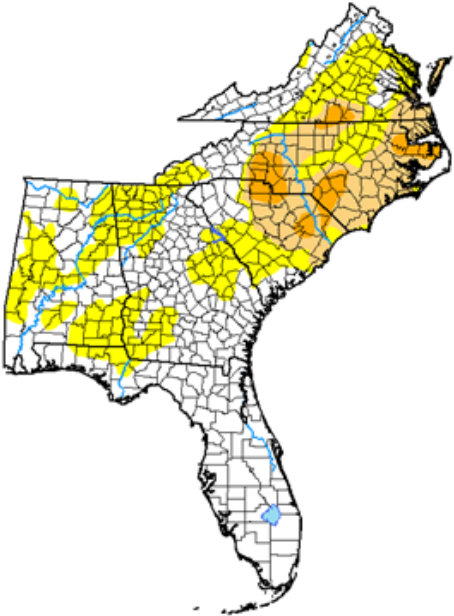


# US Drought Monitor

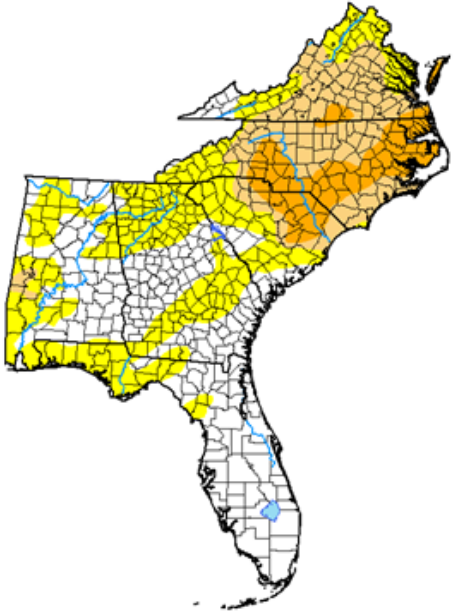
October 26, 2021



November 30, 2021



December 28, 2021

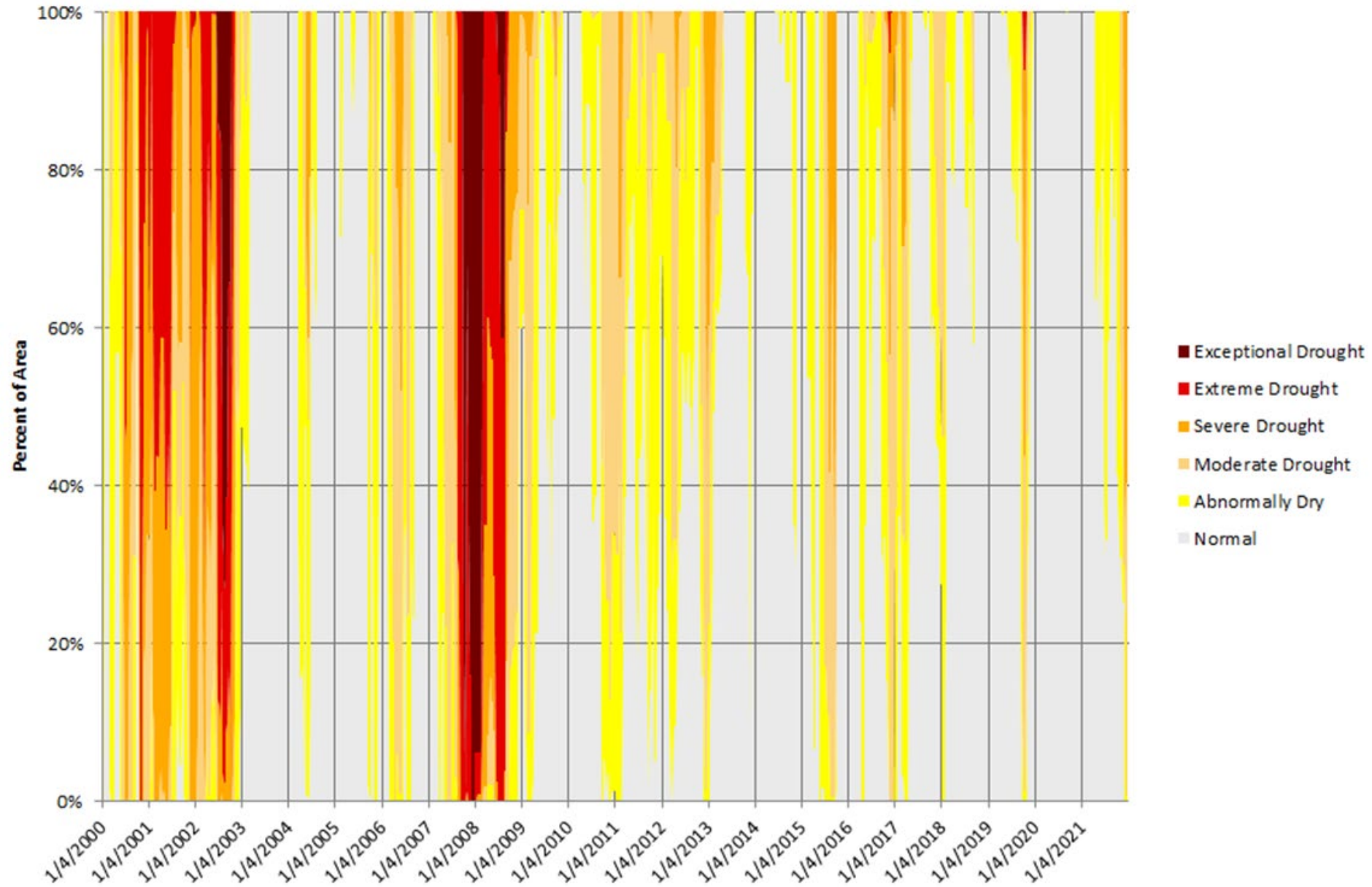


### Drought Classifications

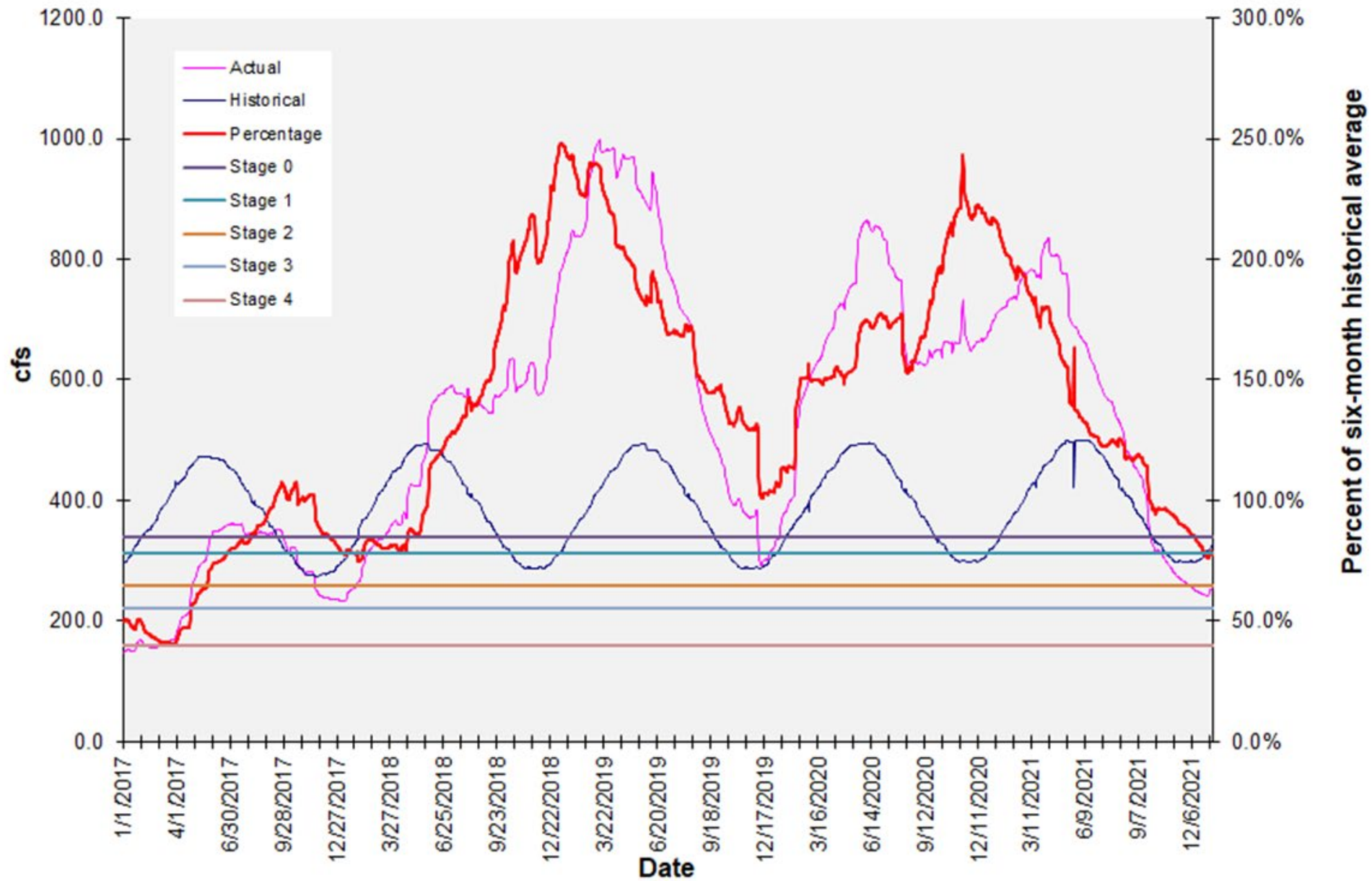
- D0 - Abnormally Dry
- D1 - Moderate Drought
- D2 - Severe Drought
- D3 - Extreme Drought
- D4 - Exceptional Drought

# Catawba-Wateree Basin

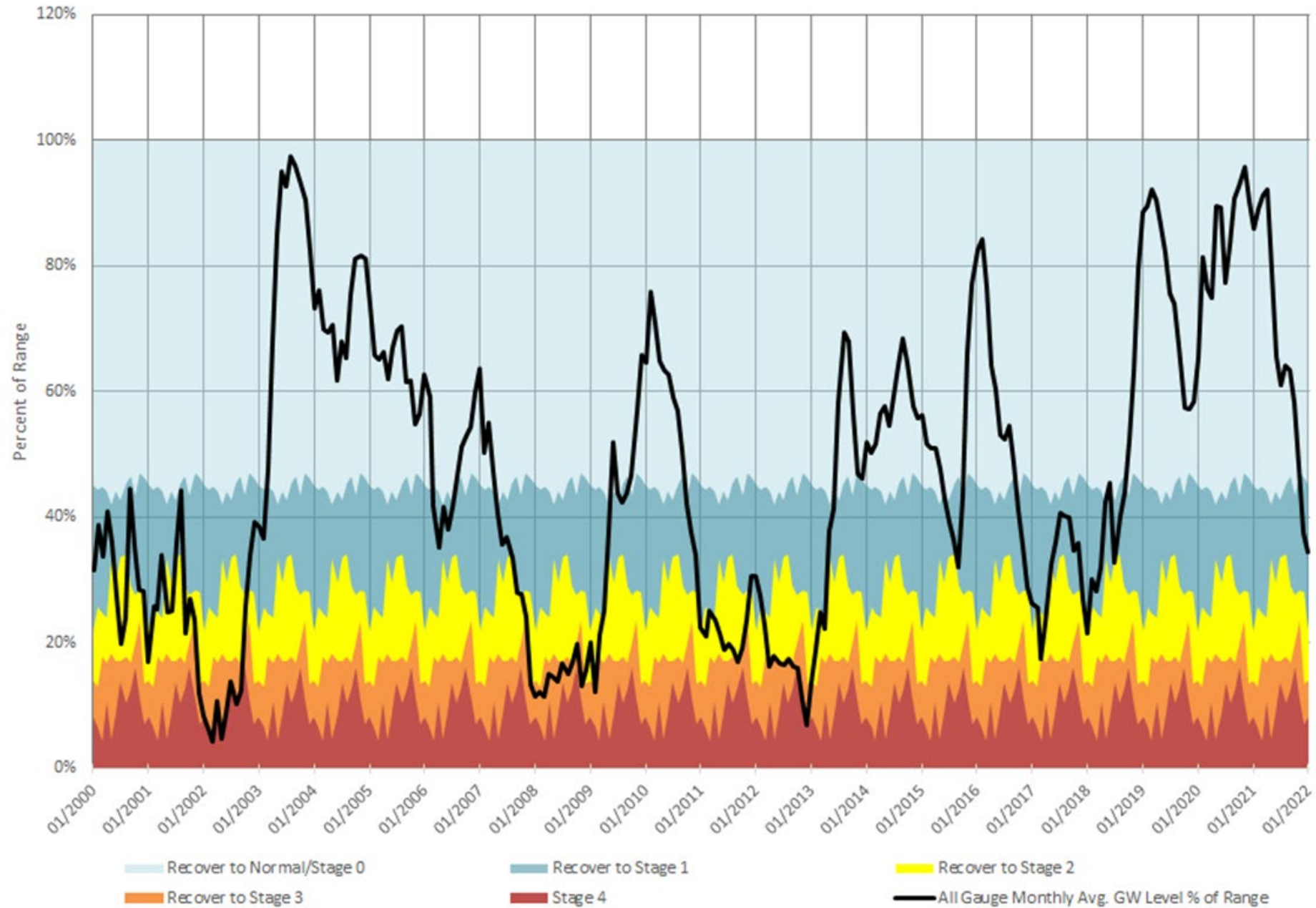
## Drought Monitor Status Distribution by Percent of Area



# CW-DMAG Six Month Streamflow Indicator



# Normalized Monthly Average Groundwater Level Percent of Range





**CATAWBA  
WATER RE  
WATER MANAGEMENT GROUP**



**Integrated Water Resources Plan**  
The WSMP Evolves...

In time and with  
water, everything  
changes.

*-Leonardo da Vinci*

# Stakeholder Outreach Highlights



5 WORKSHOPS



170+ PARTICIPANTS



OVER 150 IDEAS  
SHARED



# Regional Goals | Key Themes

Communication &  
Education

Implementation &  
Evaluation  
Mechanisms

Water Quality

Collaboration &  
Consistency

Water Quantity /  
Availability

Realistic Planning for  
Future Growth

# Key Elements of the IWRP Update

## Covering the Whole Catawba-Wateree River Basin

- **Expansion Decisions** – CWWMG membership and watershed boundary
- **Don't Trip Across that Line** – Integrating the CWWMG with a future **SC River Basin Council**
- **Relevance** - Meeting our members' changing needs
- **Modeling** – Integration of CHEOPS and WaterFALL platforms for holistic planning

## Tackling Tough Water Quality Issues

- **What we know** – Nutrients, sedimentation, TMDLs, etc.
- **What we don't know** – Emerging contaminants

## Expanding resource-sharing across political jurisdictions

- **Source Water Protection Tools** – Land conservation, BMPs / SCMs, better land use decisions
- **Staff Resources** – Can the CWWMG fill some gaps???
- **Funding** – Will dozens of political boundaries be an advantage or a hindrance???

# Five Year Schedule



| Year   | Funding Level        |
|--|----------------------|
| <b>IWRP Year 3 (2023): Detailed Evaluations and Recommendations</b>            |                      |
|  | <b>Funds</b>         |
| Activity 1 - Project Oversight and Administration (12 months)                  | \$ 30,000.00         |
| Activity 2 - Stakeholder Advisory Committee (12 months - 4 quarterly meetings) | \$ 18,000.00         |
| Activity 3 - Develop Strategic Communications Materials                        | \$ 20,000.00         |
| Activity 4 - Communication and Outreach  | \$ 15,000.00         |
| Activity 5 - Water Quantity Evaluations  | \$ 100,000.00        |
| Activity 6 - Water Quality Evaluations   | \$ 120,000.00        |
| Activity 7 - Remote Sensing for Water Concerns                                 | \$ 75,000.00         |
| Activity 8 - Regulatory Drivers  | \$ 10,000.00         |
| Activity 9 - Emerging Contaminants   | \$ 10,000.00         |
| Activity 10 - Climate Change and Variability                                   | \$ 17,000.00         |
| Activity 11 - Groundwater-Surface Water Relationship                           | \$ 25,000.00         |
| Activity 12 - Interbasin Transfer Coordination with Neighboring Basins         | \$ 10,000.00         |
| Activity 13 - Point Source Management Strategies                               | \$ 20,000.00         |
| Activity 14 - Non-Point Source Management Strategies                           | \$ 25,000.00         |
| Activity 15 - Source Water Protection Planning                                 | \$ 50,000.00         |
| <b>Year 3 Total</b>  | <b>\$ 545,000.00</b> |

| Year  | Funding Level        |
|---|----------------------|
| <b>IWRP Year 1 (September - December 2021): Basis of Planning</b> |                      |
|   | <b>Funds</b>         |
| Activity 1 - Project Oversight and Administration (4 months)      | \$ 10,100.00         |
| Activity 2 - Water Demand Projection Updates                      | \$ 79,800.00         |
| Activity 3 - Identify Water Quality Priorities (Year 1)           | \$ 38,100.00         |
| Activity 4 - Identify Future Planning Scenarios (10 scenarios)    | \$ 66,100.00         |
| <b>Year 1 Total</b>   | <b>\$ 194,100.00</b> |

| Year   | Funding Level        |
|--|----------------------|
| <b>IWRP Year 4 (2024): Final Recommendations</b>                               |                      |
|  | <b>Funds</b>         |
| Activity 1 - Project Oversight and Administration (12 months)                  | \$ 20,000.00         |
| Activity 2 - Stakeholder Advisory Committee (12 months - 4 quarterly meetings) | \$ 18,000.00         |
| Activity 3 - Communication and Outreach  | \$ 15,000.00         |
| Activity 4 - Monitoring Collaboration  | \$ 10,000.00         |
| Activity 5 - Implementation and Evaluation Plan                                | \$ 27,000.00         |
| Activity 6 - Regional Economic Impacts   | \$ 175,000.00        |
| <b>Year 4 Total</b>  | <b>\$ 265,000.00</b> |

| Year   | Funding Level        |
|--|----------------------|
| <b>IWRP Year 2 (2022): Model Updates and Preliminary Evaluations</b>           |                      |
|  | <b>Funds</b>         |
| Activity 1 - Project Oversight and Administration (12 months)                  | \$ 20,000.00         |
| Activity 2 - Strategic Communication Plan                                      | \$ 9,100.00          |
| Activity 3 - Stakeholder Advisory Committee (12 months - 4 quarterly meetings) | \$ 25,000.00         |
| Activity 4 - Identify Water Quality Priorities (Year 2)                        | \$ 12,000.00         |
| Activity 5 - Regulatory Agency Coordination for Water Resources Modeling       | \$ 16,000.00         |
| Activity 6 - Hydrologic Model Updates  | \$ 136,000.00        |
| <b>Year 2 Total</b>  | <b>\$ 218,100.00</b> |

| Year  | Funding Level        |
|---|----------------------|
| <b>IWRP Year 5 (2025): Production and Roll-Out</b>  |                      |
|   | <b>Funds</b>         |
| Activity 1 - Project Oversight and Administration (12 months)                                 | \$ 15,000.00         |
| Activity 2 - Communication, Outreach & Rollout (video, presentations, resolutions of support) | \$ 30,000.00         |
| Activity 3 - IWRP Report - InDesign Production  | \$ 40,000.00         |
| Activity 4 - ESRI Storymap (interactive)  | \$ 20,000.00         |
| Activity 5 - GIS Update & Web Mapping Application   | \$ 25,000.00         |
| Activity 6 - PowerBI (data processing and visualization)                                      | \$ 10,000.00         |
| <b>Year 5 Total</b>   | <b>\$ 140,000.00</b> |

|                           |                       |
|---------------------------|-----------------------|
| <b>5 Year Grand Total</b> | <b>\$1,362,200.00</b> |
|---------------------------|-----------------------|

# Year 1

## IWRP Year 1 (September - December 2021): Basis of Planning

Activity 1 - Project Oversight and Administration (4 months)

Activity 2 - Water Demand Projection Updates

Activity 3 - Identify Water Quality Priorities (Year 1)

Activity 4 - Identify Future Planning Scenarios (10 scenarios)

# Year 2

## IWRP Year 2 (2022): Model Updates and Preliminary Evaluations

Activity 1 - Project Oversight and Administration (12 months)

Activity 2 - Strategic Communication Plan

Activity 3 - Stakeholder Advisory Committee (12 months - 4 quarterly meetings)

Activity 4 - Identify Water Quality Priorities (Year 2)

Activity 5 - Regulatory Agency Coordination for Water Resources Modeling

Activity 6 - Hydrologic Model Updates

# Year 3

## IWRP Year 3 (2023): Detailed Evaluations and Recommendations

- Activity 1 - Project Oversight and Administration (12 months)
- Activity 2 - Stakeholder Advisory Committee (12 months - 4 quarterly meetings)
- Activity 3 - Develop Strategic Communications Materials
- Activity 4 - Communication and Outreach
- Activity 5 - Water Quantity Evaluations
- Activity 6 - Water Quality Evaluations
- Activity 7 - Remote Sensing for Water Concerns
- Activity 8 - Regulatory Drivers
- Activity 9 - Emerging Contaminants
- Activity 10 - Climate Change and Variability
- Activity 11 - Groundwater-Surface Water Relationship
- Activity 12 - Interbasin Transfer Coordination with Neighboring Basins
- Activity 13 - Point Source Management Strategies
- Activity 14 - Non-Point Source Management Strategies
- Activity 15 - Source Water Protection Planning

# Year 4

## IWRP Year 4 (2024): Final Recommendations

Activity 1 - Project Oversight and Administration (12 months)

Activity 2 - Stakeholder Advisory Committee (12 months - 4 quarterly meetings)

Activity 3 - Communication and Outreach

Activity 4 - Monitoring Collaboration

Activity 5 - Implementation and Evaluation Plan

Activity 6 - Regional Economic Impacts

# Year 5

## IWRP Year 5 (2025): Production and Roll-Out

Activity 1 - Project Oversight and Administration (12 months)

Activity 2 - Communication, Outreach & Rollout (video, presentations, resolutions of support)

Activity 3 - IWRP Report - InDesign Production

Activity 4 - ESRI Storymap (interactive)

Activity 5 - GIS Update & Web Mapping Application

Activity 6 - PowerBI (data processing and visualization)

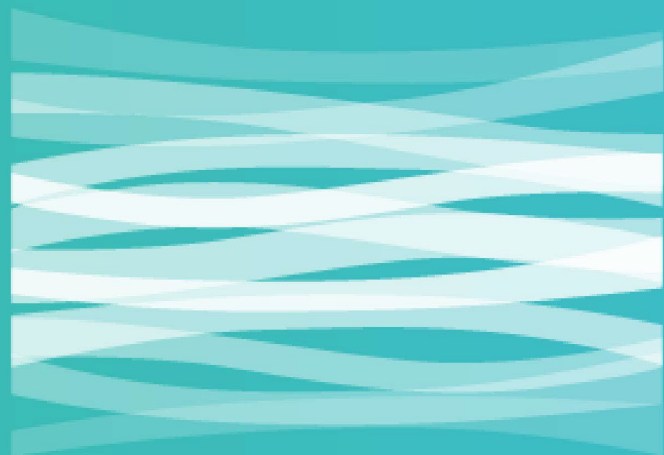


# Resources



**Visit our website for  
Presentation Slides,  
Graphics, 2019-20 Annual  
Report, and more!**

[www.catawbawatereewmg.org](http://www.catawbawatereewmg.org)



**CATAWBA**  
**WATEREE**  
WATER MANAGEMENT GROUP

**THANK YOU**