

AN INTEGRATED RESOURCE PLAN FOR TACOMA WATER



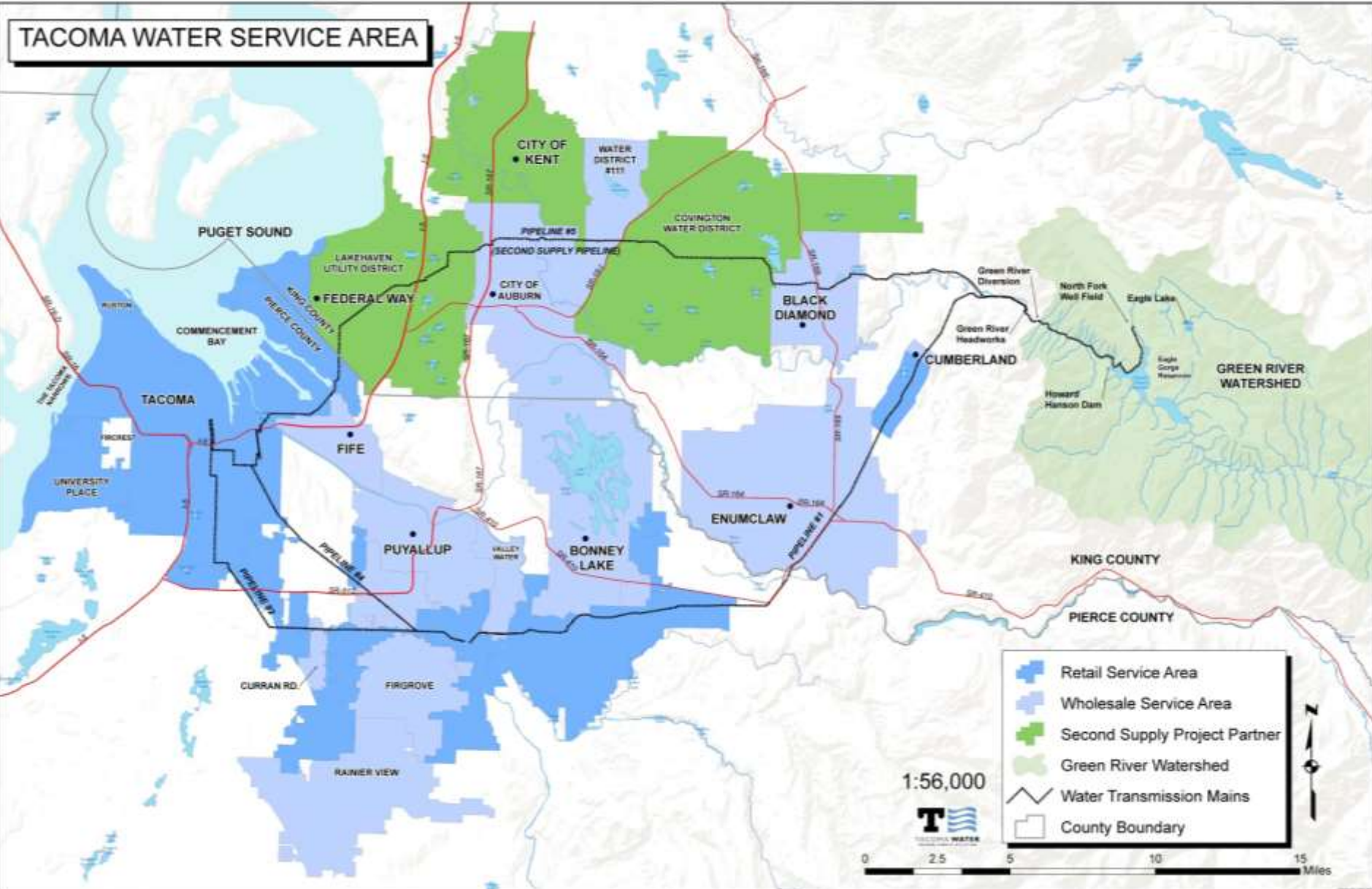
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OUTLINE FOR TODAY'S DISCUSSION

- OVERVIEW OF TACOMA WATER
- WHY NOW?
- INTEGRATED RESOURCE PLAN (IRP) PROCESS AND SCHEDULE
- PUBLIC ADVISORY COMMITTEE
- WYSDM MODEL – LONG TERM AND SHORT TERM
- WATER SHORTAGE RESPONSE PLAN UPDATE
- CONSERVATION PROGRAM UPDATE
- RECLAIMED WATER REVIEW
- NEXT STEPS



TACOMA WATER SERVICE AREA



TACOMA WATER – BASIC FACTS

- **316,000 PEOPLE DIRECTLY SERVED BY TACOMA WATER**
- **221,000 PEOPLE ARE SERVED IN PARTNER SERVICE AREAS**
- **PLANT VALUE OF OVER \$1 BILLION**
- **AVERAGE DAILY USE OF 50 MGD
(60 MGD WITH PARTNERS)**
- **SUMMER PEAK DEMAND OF 80 MGD
(100 MGD WITH PARTNERS)**
- **95% GREEN RIVER, 5% GROUNDWATER WELLS**
- **25 WELLS CAPABLE OF APPROXIMATELY 55 MGD**

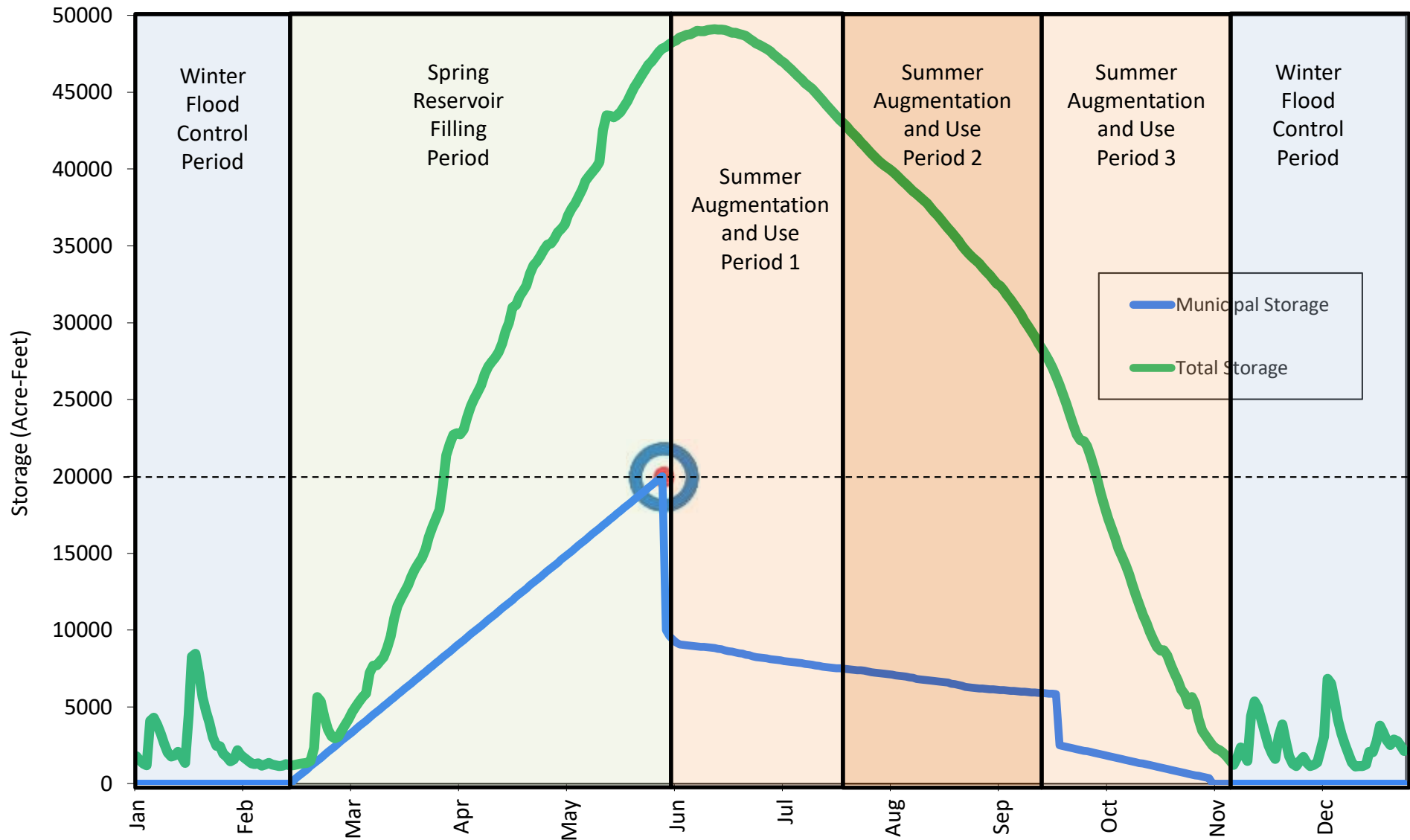
GREEN RIVER SUPPLY

- TACOMA'S PRIMARY WATER SOURCE
- RECENTLY HAS SUPPLIED 95% OF OUR WATER
- FIRST DIVERSION WATER RIGHT (FDWR)
 - APPROX. 73 MGD
- SECOND DIVERSION WATER RIGHT (SDWR)
 - APPROX. 65 MGD
 - SHARED WITH OUR 3 PARTNERS
 - CAN BE STORED
- BOTH RIGHTS ARE CONSTRAINED TO ENSURE ADEQUATE MINIMUM INSTREAM GREEN RIVER FLOWS



TACOMA WATER DIVERSION DAM AND INTAKE

STORAGE AT HOWARD HANSON DAM



TACOMA'S GROUNDWATER

- LESS AFFECTED BY DROUGHTS THAN ARE RIVER FLOWS
- ADDS VALUABLE DIVERSITY TO THE SOURCES AVAILABLE
- NORMALLY MAKES UP ONLY ~5% OF OUR PRODUCED WATER BUT IN YEARS WHEN THE RIVER SOURCE IS STRESSED, WELLS MAY BE USED TO PROVIDE UP TO 40% - 50% OF OUR SUMMER DEMAND
- USED ON A SEASONAL AND CONVENIENCE BASIS RATHER THAN CONTINUOUSLY
- PROVIDES A CRITICAL SUPPLEMENTAL AND BACKUP WATER SUPPLY



IRP: WHY NOW?

MAJOR SYSTEM CHANGES

- ADDITIONAL WATER STORAGE PROJECT
- SECOND SUPPLY PIPELINE
- FILTRATION

FOCUS ON CORROSION CONTROL FOR GROUNDWATER
MODELING CAPABILITIES HAVE DEVELOPED SIGNIFICANTLY
SURPLUS WATER SALES

TACOMA POWER ALREADY HAS AN IRP

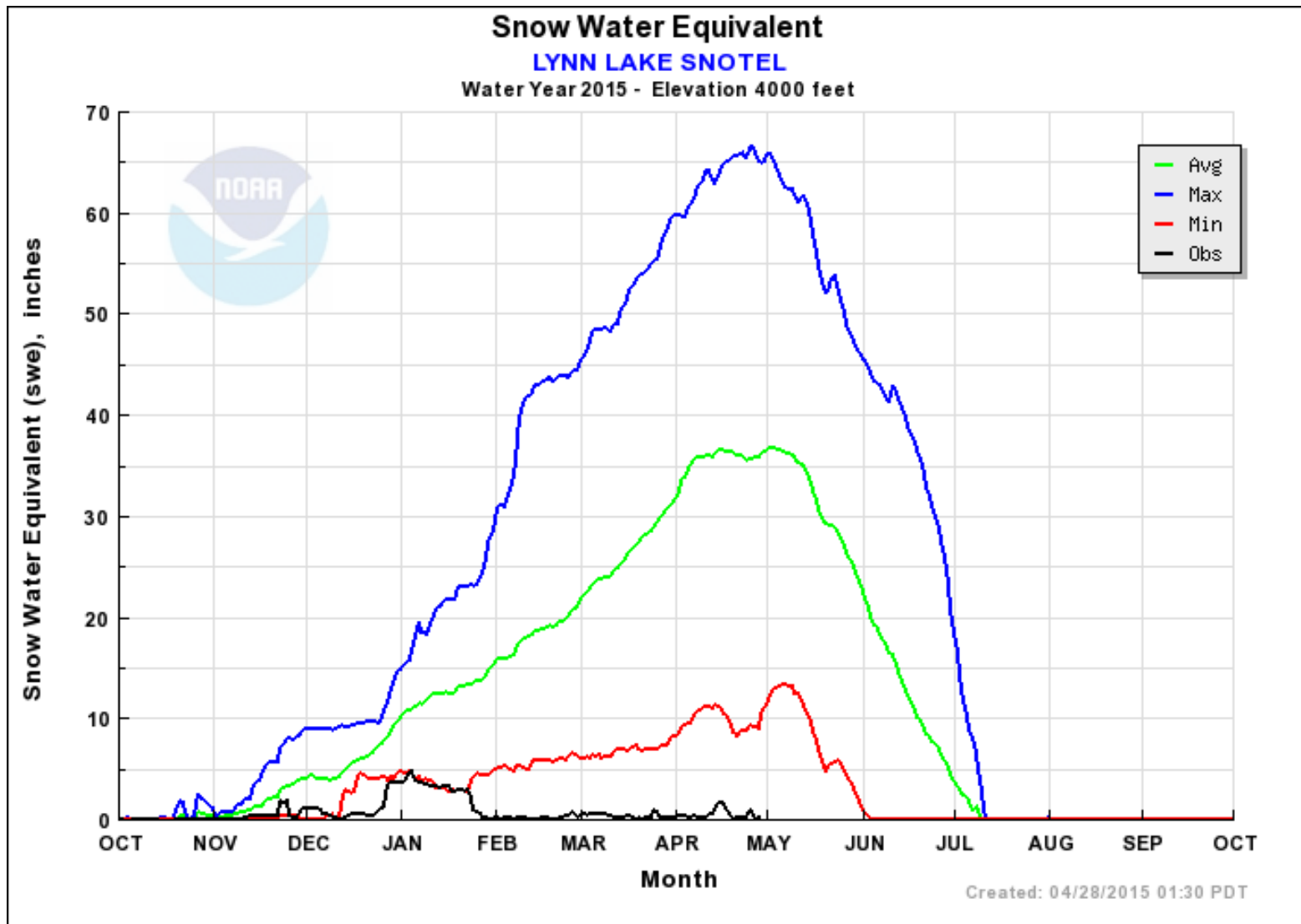
WATER SYSTEM PLAN WAS REQUIRED

DEMANDS HAVE DECLINED 30-35% (1980'S TO PRESENT)

2015

- UNPRECEDENTED DROUGHT - VOLUNTARY CURTAILMENT
- PROPOSED NEW 10 MGD INDUSTRIAL FACILITY

2015 SNOWPACK IN GREEN RIVER WATERSHED



JUNE GREEN RIVER INSTREAM FLOW



OVERVIEW OF THE IRP PROCESS

EMPANELED A PUBLIC ADVISORY COMMITTEE

HIRED A CONSULTANT (HDR) TO HELP WITH:

- WATER SUPPLY YIELD MODEL
- GROUNDWATER EVALUATION
 - BOTH QUANTITY AND QUALITY
- CONSERVATION PROGRAM ASSESSMENT & UPDATE
- FUTURE SCENARIO DEVELOPMENT
- WRITING OF “THE PLAN”

INTENT:

- ARTICULATE STATE OF THE WATER RESOURCE PORTFOLIO
- ALLOW RISKS TO BE UNDERSTOOD AND MANAGED
- TRANSPARENCY FOR WATER SUPPLY & DEMAND DECISIONS
- GUIDE FUTURE WATER RESOURCE INVESTMENTS

IRP SCHEDULE

MODEL DEVELOPMENT – SPRING 2017 - CONTINUING

GROUNDWATER EVALUATION – SUMMER / FALL 2017

DEFINITION OF FUTURE SCENARIOS – FALL 2017

INCLUSION OF CLIMATE CHANGE INTO MODEL – SPRING 2018

MODEL RUNS WITH SCENARIOS – EARLY 2018 - CONTINUING

DRAFT REPORT – MAY 2018

FINAL REPORT – JUNE 2018

IRP PUBLIC ADVISORY COMMITTEE

GOALS FOR ENGAGEMENT

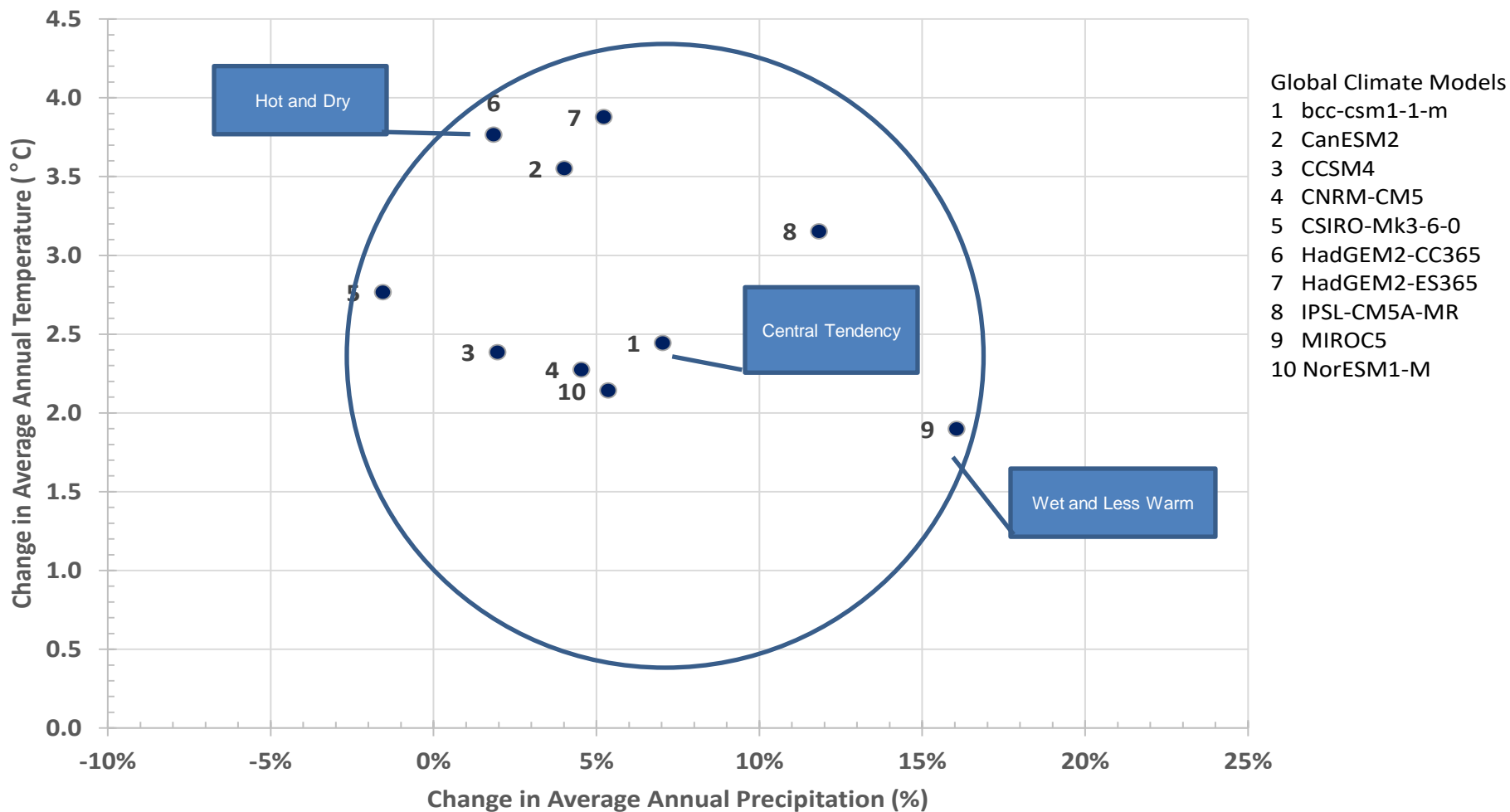
- INCREASE AWARENESS OF SUPPLY AND DEMAND DYNAMICS
- INCREASE AWARENESS OF CURRENT AND FUTURE MANAGEMENT STRATEGIES
- SOLICIT INFORMED PERSPECTIVES ON A NUMBER OF TOPICS INCLUDING OUR CONSERVATION PLAN UPDATE
- DEVELOP KEY RELATIONSHIPS FOR ONGOING PUBLIC ENGAGEMENT

5 MEETINGS

- CONSERVATION PROGRAM ALTERNATIVES
- FUTURE RESOURCE ALTERNATIVES
- RESOURCE ADEQUACY STANDARD
- DEVELOP FUTURE SCENARIOS
- CLIMATE CHANGE REPRESENTATION

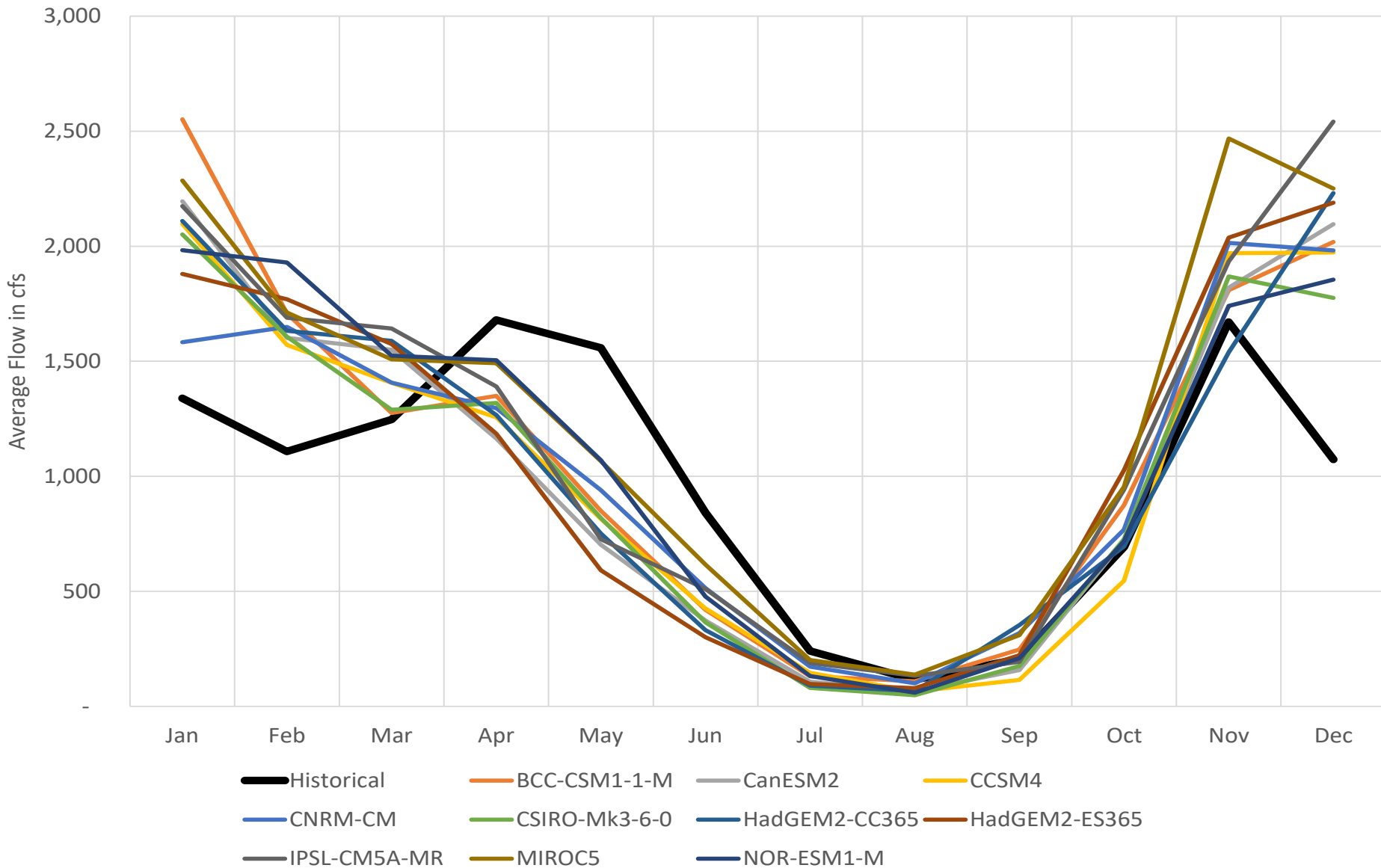
GLOBAL CLIMATE MODEL SELECTION

Change in Precipitation and Temperature near Puyallup
for 10 Global Climate Models
(RCP 8.5, MACA 2050s)
Compared to Historical (1984 to 2013)



CHANGE IN INFLOW DUE TO CLIMATE CHANGE

Average Monthly Simulated Natural Howard Hanson Dam Inflow



WYSDM

“WATER YIELD, SUPPLY & DEMAND MODEL”

Hydrologic Database

Including 101 years of historic data, up to 1,000 years of statistically generated historic data, and three scenarios of selected climate change data



System Data

Capacities, constraints, operating rules, switchable for scenario evaluation



Water Demands Module

Selectable sets of variable, daily demands for existing and future – including Second Diversion Partners and wholesale users



Graphical User Input:

Assumptions, data, simulation type



Real-time Data and Forecasts

Developed from:

Real-time reservoir storage data and selectable and adjustable historic, or projected hydrology and meteorological data



Tacoma Water



Surface Water Model

Use available DHSVM Model*

An accurate, detailed ability to simulate the hydrologic response of the Green River watershed under variable climate assumptions

*(available, but not currently implemented)



Simulation Results: Tables & Graphics, Key Metrics:

Summarize the scenario results based on how Tacoma Water decisions are made



Groundwater Module

Availability summary/ extraction limitations

Interactive summary of key availability/limitation characteristics, include selectable utilization options for scenario evaluation



TWO MODES OF ANALYSIS

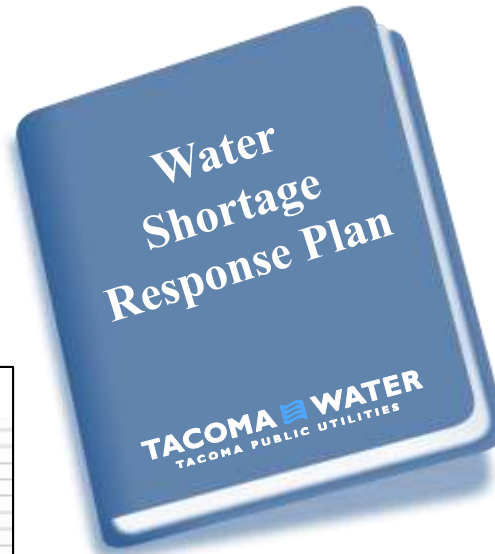
LONG-TERM

- ROBUST AND ANALYTICALLY SOUND RESOURCE PLAN
- ENSURE CONTINUED WATER AVAILABILITY
- FOR THE COMMUNITY AND THE ENVIRONMENT
- WELL INTO THE FORESEEABLE FUTURE (DECADES)

SHORT-TERM

- ENHANCE FORECASTING CAPABILITIES
- MANAGE WATER RESOURCES AND SYSTEM DEMANDS
- MEET CUSTOMERS NEEDS
- MINIMIZE EFFECTS ON THE ENVIRONMENT DURING DIFFICULT WATER YEARS (REST OF THE YEAR)

IRP TOPICS: WATER SHORTAGE RESPONSE PLAN UPDATE



Demand Side Solutions

- Limit peak summer demand – outdoor irrigation and lawn watering

Supply Side Solutions

- Pump Eagle Lake
- Start seldom-used wells
- Buy from neighbors
- Request partner shortage
- Pursue other sources

IRP TOPICS: CONSERVATION PROGRAM UPDATE

BASED ON FEEDBACK FROM THE PUBLIC ADVISORY COMMITTEE AND OTHERS, THE FOLLOWING IS THE PROPOSAL:

PROPOSED NEW GOAL: 6.65% **PEAK**
(MAY-OCT) REDUCTION FROM 2018
TO 2027

PROPOSED NEW PROGRAMMING:

- SMART IRRIGATION CONTROLLER REBATES
- OUTDOOR WATER EFFICIENCY KIT GIVEAWAYS
- IRRIGATION AUDITS
- INCREASED MULTIFAMILY PROGRAMMING



IRP TOPICS: RECLAIMED WATER

CITY OF TACOMA

- MET WITH ENVIRONMENTAL SERVICES IN 2017.
- INDICATED THAT RECLAIMED WATER IS NOT CURRENTLY COST COMPETITIVE.
- NO CURRENT PLANS TO MARKET OR SELL RECLAIMED WATER.
- PLANT CURRENTLY PRODUCES CLASS C WATER; LARGE PER GALLON INCREASE IN COST TO PRODUCE CLASS A WATER.
- TACOMA WATER WILL CONTINUE TO MONITOR.

PIERCE COUNTY

- TEHALEH (MASTER PLANNED COMMUNITY NEAR BONNEY LAKE) WILL PRODUCE CLASS A WATER.
- WILL BE USED FOR IRRIGATION, INFILTRATION, AND LIMITED COMMERCIAL BUSINESSES.
- PIPING FOR DISTRIBUTION OF THE RECLAIMED WATER (“PURPLE PIPE”) IS BEING INSTALLED IN THE DEVELOPMENT IN PREPARATION .



NEXT STEPS

- **FINALIZE WYSDM**
 - **FIRM YIELD IS XX WITH XX% CONFIDENCE**
 - **AVAILABLE SURPLUS WATER WITH XX% CONFIDENCE**
- **USE WYSDM TO EVALUATE SCENARIOS**
- **FINALIZE RESOURCE ADEQUACY STANDARD**
- **EVALUATE SUPPLY AND DEMAND ALTERNATIVES**
- **DETERMINE RESOURCE STRATEGY AND ACTION PLAN**
 - **IDENTIFY A CLEAR PLAN FOR SYSTEM IMPROVEMENTS**
- **UPDATE ANCILLARY PLANS**
- **COMPILE IRP DOCUMENT AND USE IT!**

- **UPDATE IRP IN 3-5 YEARS!**



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