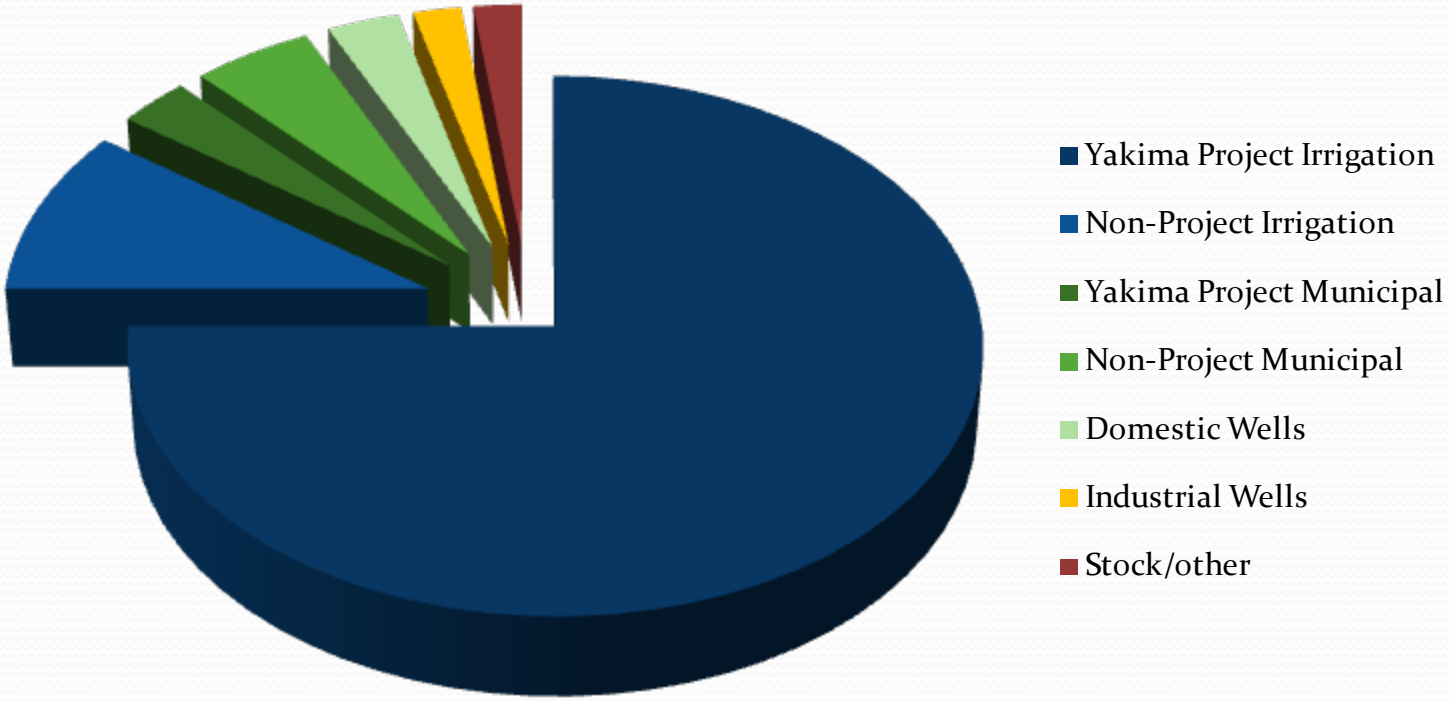
YRBWEP 2010 Basin Study Out-of-Stream Water Needs Subcommittee

Meeting 2

March 18, 2010

Out-of-Stream Water Use Categories

(Quantities are Conceptual Only)



Framework for the Assessment

1. Current uses and deficiencies
   - Transparent documentation
   - Explain how needs are calculated

2. How needs may change in the future
   - New or additional conservation
   - Land-use conversion
   - Climate change scenarios
   - Alternative crop mixes (?)
   - Population growth

Municipal, Domestic Needs

Current Needs

- Municipal
  - Method 1: Draw from Water System Plans
  - Method 2: Draw from Annual Reports to WSDOH
  - Method 3: Survey water systems to improve consistency; and extrapolate to fill gaps
  - **Method 4: Combine these approaches**

- Domestic
  - Gather county data to estimate number of homes with wells
  - Estimate usage based on use per household in metered municipal systems

Future Municipal/Domestic Needs

- Method 1: Use projections from Water System Plans
  - Simple, but inconsistencies hamper analysis
- Method 2: Develop per-unit projections using County/City growth projections
- Method 3: Econometric Forecast
  - Most accurate, but requires detailed data
- **Method 4: Hybrid of Methods 2 and 3**

Some Background

- State standards focus on goal-setting and consideration of conservation in water system plans
- Each municipal system can develop its own goals and program
- Domestic wells are not addressed
- Regional planning is hypothetical, unless a regional program is developed

Options on Conservation Assessment

- Document current program in each community and current plans/goals
  - Limited to short term
  - May be little or no information for some communities
- Develop regional “what-if” scenarios:
  - …If consistent programs applied throughout basin
  - …If programs expand to include domestic well owners
  - …If expanded federal supplies came with a conservation condition

Agricultural Irrigation Needs

Some Important Considerations

- Among federal water users, dry-year deficiencies affect only pro-ratable districts
- Substantial quantities diverted for irrigation return to the river and may be used again by others

Document Background Information

- Irrigated acreage;
- Breakdowns by crop type;
- Crop irrigation requirement and total volume required for normal (non-drought) crop production;
- Extent of “recycling” of irrigation supplies downstream
- How conservation actions affect:
  - a. stream flow and
  - b. available supply

Approaches for Current Uses/Needs

- **Method 1:** Supply available to Pro-ratable Districts in dry years
  - % of entitlement
  - Quantity in acre-feet, by District
  - Comparison with quantities diverted in normal years, by District

- **Method 2:** Adjust for Pro-rationed Period

Method 1: Annual Accounting

District	Water Entitlement (000's AF)	Average Diversion, in Normal Years	Water Available at 70% Proration (& recurrence interval)	Water Available at 50% Proration (& recurrence interval)	Water Available At 35% Proration (& recurrence interval)
KRD					
Roza					
WIP					
Other Pro-ratable Districts					
Total Need					

This method gives a high-level assessment of need for the pro-ratable Districts

Farm-Level Effects

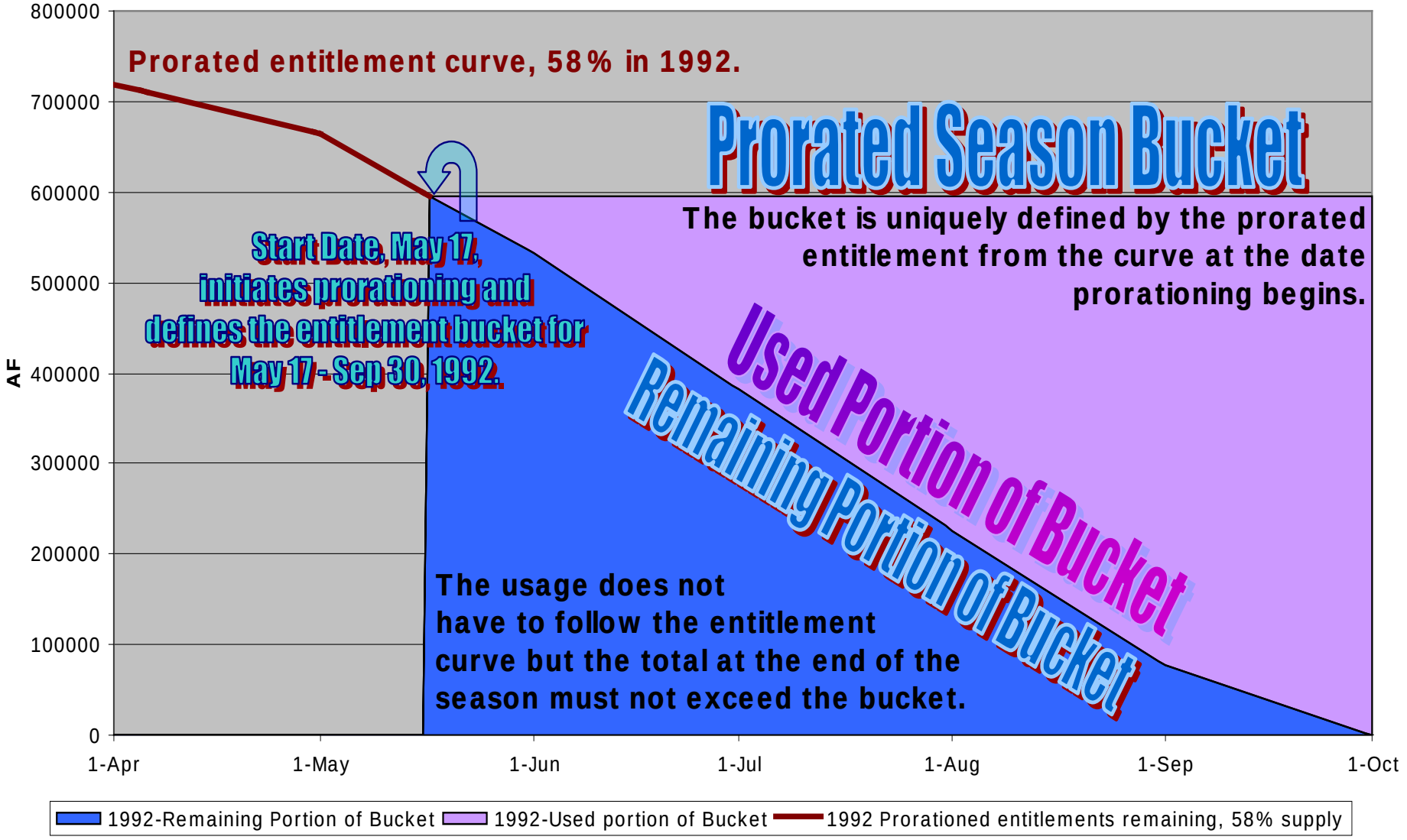
	Deliveries in Average Year (AF)	Deliveries in Dry Year 1 (AF)	Deliveries in Dry Year 2 (AF)	Crop Require-ment (AF)	Shortfall in Dry Year 1 (AF)	Shortfall in Dry Year 2 (AF)
KRD						
Roza						
WIP						
Other Pro-ratable Districts						
Total						

Show how farm deliveries compare with crop requirements in each proratable district.

Method 2: Adjust for Pro-Rationed Period

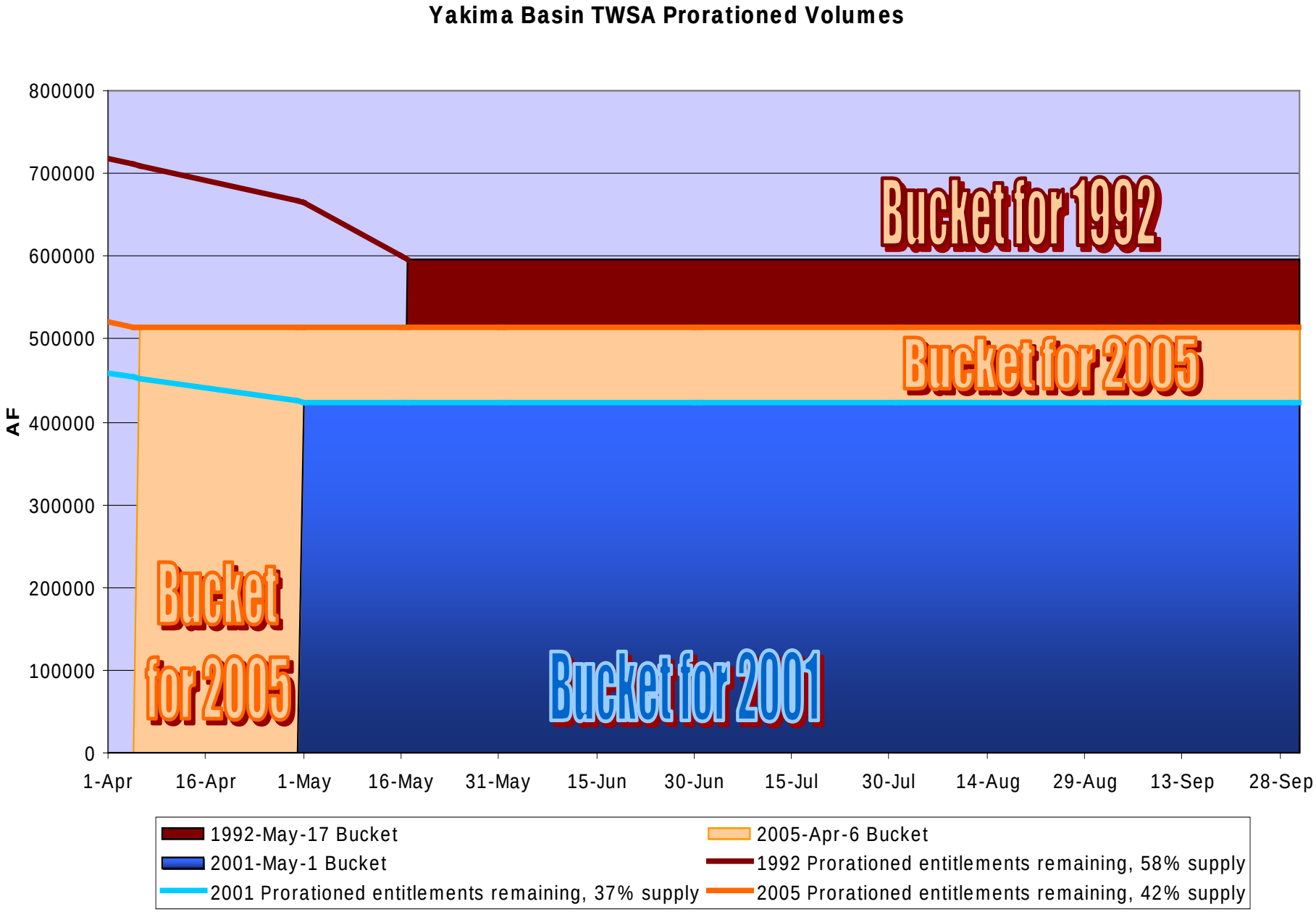
- Prorationing starts when water must be released from reservoirs to meet system demands.
- Proratable “Bucket” is defined by the prorated entitlement remaining from the date prorationing begins to September 30.
- The bucket can be used at any realistic rate until it has been used up.

Yakima Basin Prorationed Entitlement Bucket

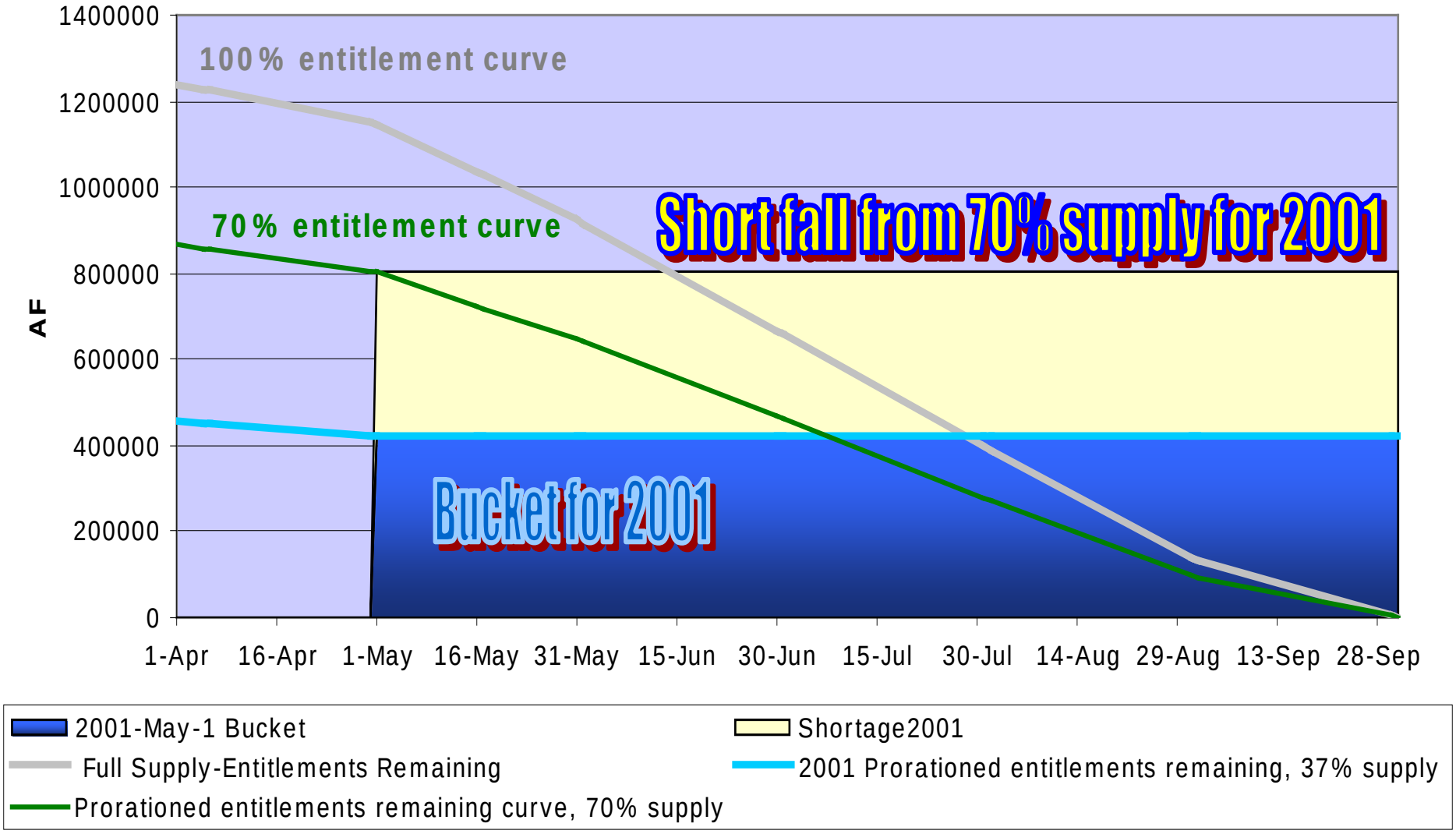


Yakima Basin Prorationed Years

- Each year's supply is uniquely defined by a start date and a rate.
- Each year's shortage is therefore also unique, even if nominal percentage is the same.
- Years with similar nominal percentages can respond differently to system changes like additional storage.


Yakima Basin TWSA Prorationed Volumes
800000
700000
600000
500000
400000
300000
200000
100000
0
AF
1-Apr
16-Apr
1-May
16-May
31-May
15-Jun
30-Jun
15-Jul
30-Jul
14-Aug
29-Aug
13-Sep
28-Sep
Bucket for 1992
Bucket for 2005
Bucket for 2005
Bucket for 2001
1992-May-17 Bucket
2005-Apr-6 Bucket
2001-May-1 Bucket
1992 Prorationed entitlements remaining, 58% supply
2001 Prorationed entitlements remaining, 37% supply
2005 Prorationed entitlements remaining, 42% supply

Yakima Basin TWSA Prorationed Volumes



Other Methods Considered

- Crop-land calculations combined with standard crop irrigation requirements
  - Inadequate data for conveyance losses and other factors
- Water balance approach and basin-wide estimate of water supply per acre
  - Helps account for “recycling” downstream
  - However some key data missing for calculation

Characterize Effect of Shortages on Farm Production

- Change in farm output in dry years for the different pro-ratable districts
  - E.g. Reduce from 3 to 2 hay cuttings
  - Reduce row crop production
  - Loss of orchard fruit production
  - Loss of orchard trees
- Note economic analysis by ECONorthwest also scoped
  - Change in value of goods and services with supply enhancements

Coping Strategies in Use Today

- Coping strategies used in dry years
  - Land fallowing with economic losses
  - Water transfers
  - Non-proratables may reduce usage voluntarily
  - Drought-year use of ground water supplies

Recent Conservation in Agricultural Sector

- Document actions taken in past years
  - District actions
  - On-Farm actions
- Construct trend-lines of total water diversions per acre (in normal supply years)

Future Considerations

- Conversion of some agricultural lands to urban uses
- Conservation identified for near term
  - District actions
  - On-Farm actions
- Additional conservation scenarios for longer term
- Climate change effects on crop-irrigation requirements (Longer growing season? Increased E-T?)
  - Draw from UW analysis of Yakima Basin
- Changes in crop mix? (how define?)

Irrigation – Non Federal

- Estimate non-federal acreage
- Estimate current needs based on crop irrigation requirement and provision for conveyance losses
- Adequate, since supply program is not designed to improve supply for non-Federal irrigators
- Document conservation actions (Conservation Districts, Conservation Commission, Ref. 38, BPA)

Other Uses

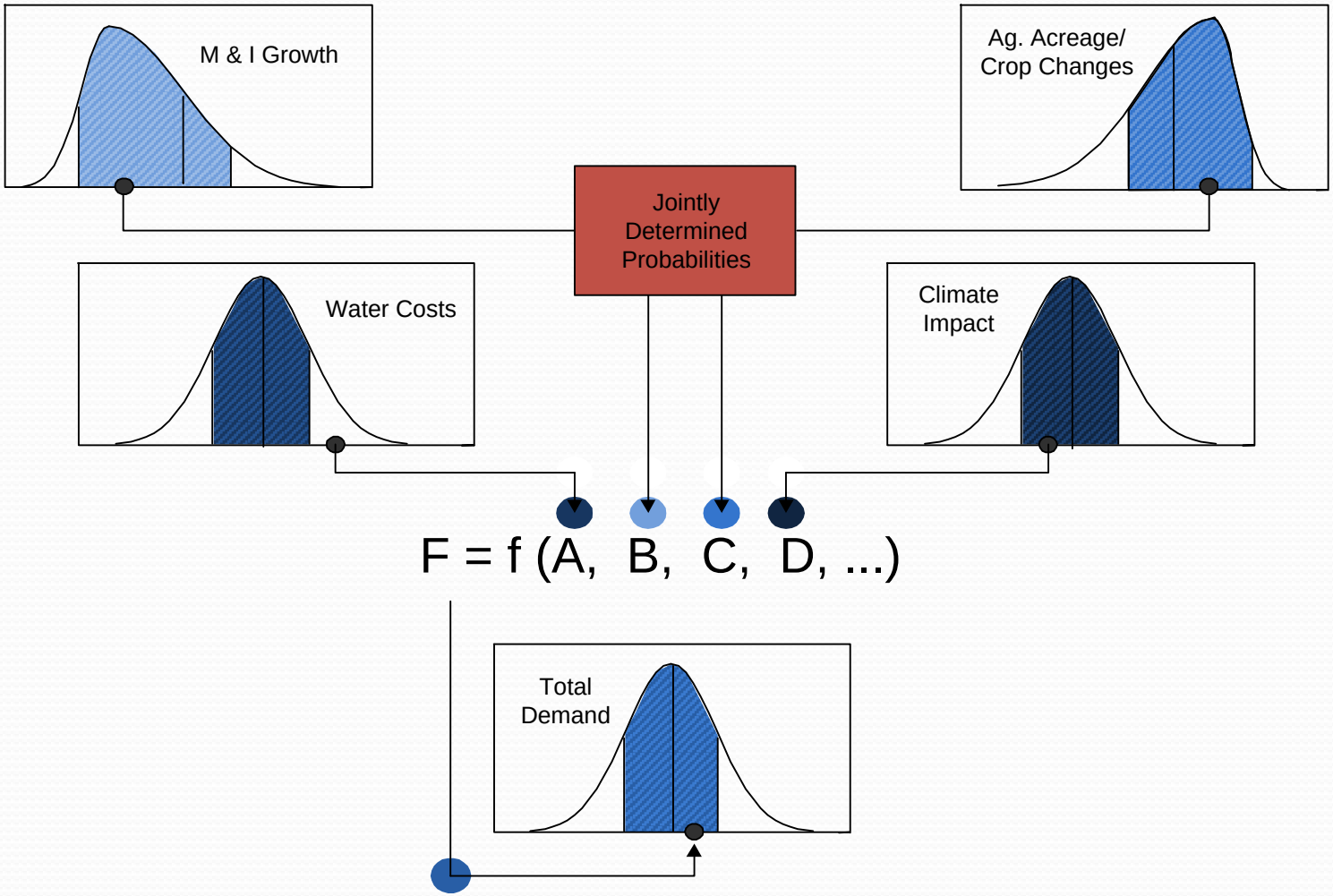
Categories

- Stock watering
- Industrial facilities with their own supplies
- Gravel mining
- Many other specific categories with water rights

How important is it to estimate needs in these categories?

Uncertainty Analysis on Future Needs

Uncertainty Analysis



Uncertainties in Municipal Forecast

- Variable estimates for population growth
- Range of outcomes for conservation programs
- Effects of potential climate change on outdoor water use

Uncertainties in Future Agricultural Needs

- Range of effects from Climate Change
- Range of potential changes in crop mix
- Range of conservation implementation

Questions/Discussion