



An Abbreviated Draft Summary of Economic, Demographic and Water Demand Projections for the Wind/Big Horn River Basin

Presented to:

**The Wind/Big Horn River Basin Advisory Group and
Wyoming Water Development Commission Staff**

Presented by:

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Inputs and Outputs for the Water Demand Projections

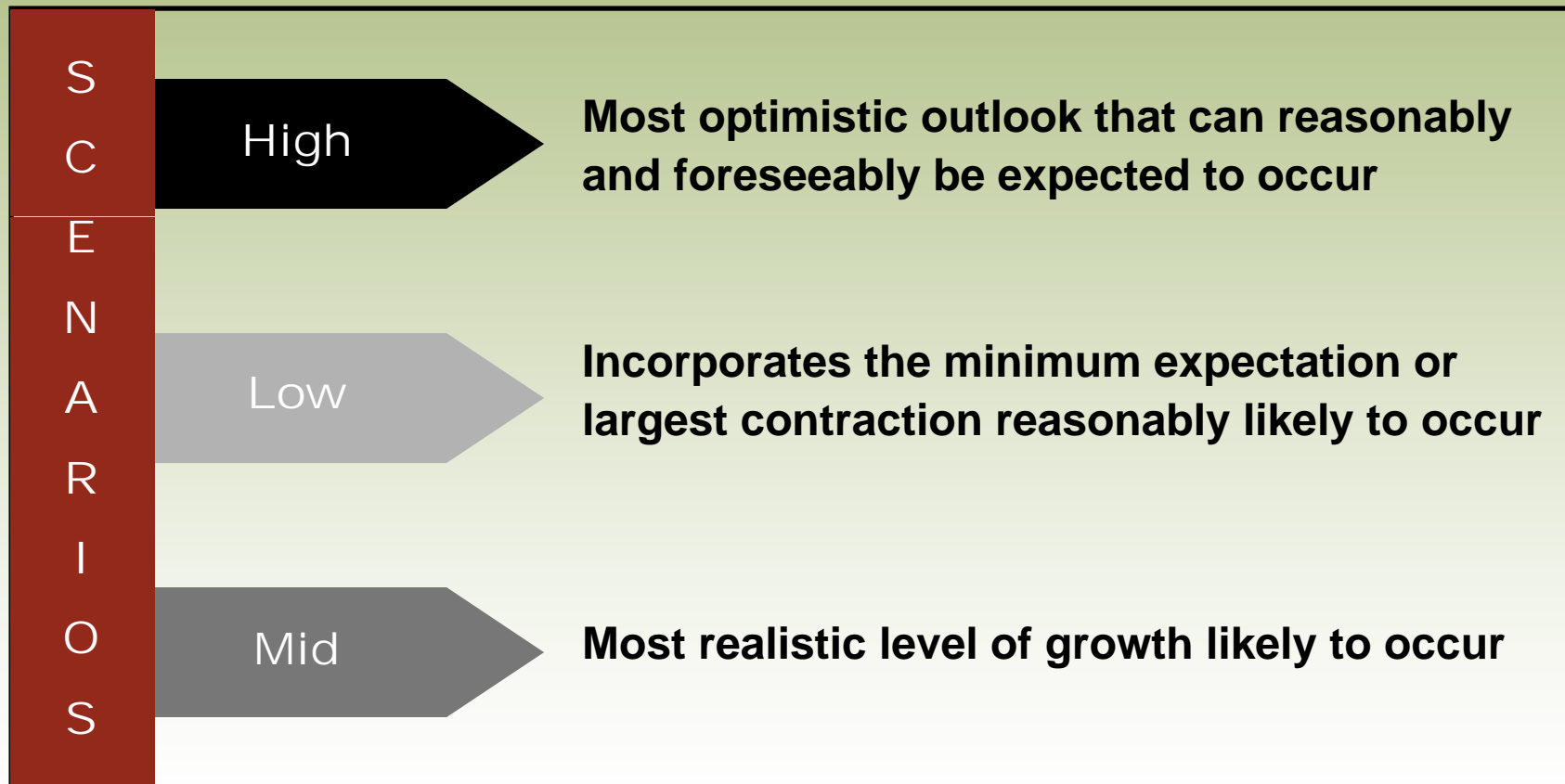
<u>Water Use Sector</u>	<u>Driving Variables</u>	<u>Water Use Patterns/ Intensity</u>
Agricultural		
Irrigation	Irrigated acreage	Water use by crop type, head
Livestock	Number of head	Conservation assumptions
Industrial/Water Intensive		
Oil and gas	Number of wells drilled Barrels/BCF produced; transported	Water use per unit of output
Power generation	MWh generation by type	Water use per unit of output
Other	Units of output	Water use per unit of output
Municipal and domestic		
Residents and support business	Population, housing units	Gallons per capita or per dwelling unit per day
Recreational	Visitor-days by activity	Volume required by season
Environmental	Instream flow filings	Legal determination
Wind River Indian Reservation (WRIR)	Big Horn Decree	As desired and feasible

...Heading to 50 Year, Low/High/Medium Water Demand Projections



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Scenario Approach to Economic and Demographic Forecasting in the Wind/Big Horn River Basin



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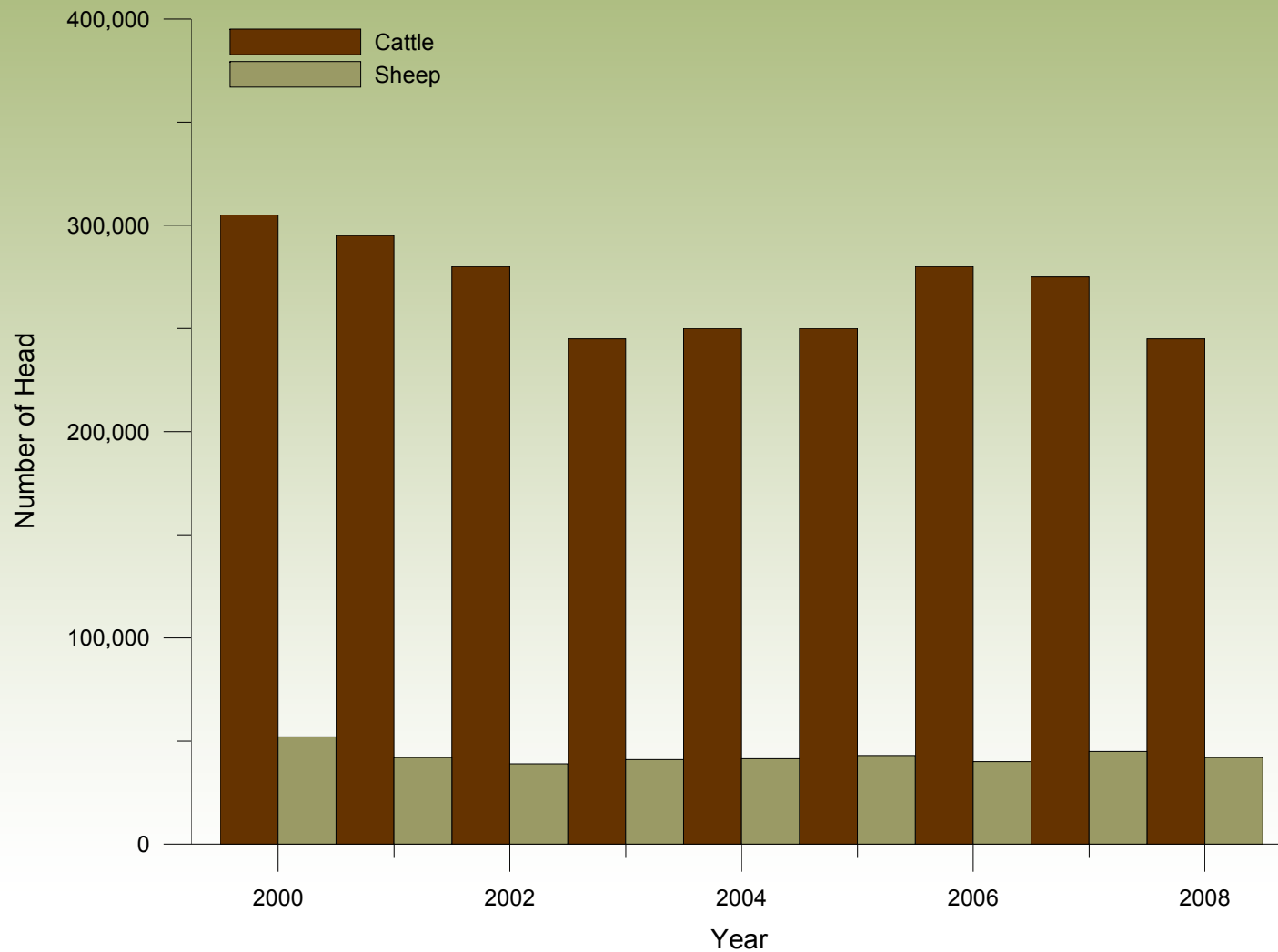
An Overview of Agriculture in the Wind/Big Horn Basin

- Basin agriculture proportion of State agriculture
24% Annual Sales, 19% Cattle and Calves,
22% Crop Acreage
- Livestock sales almost two-thirds of annual cash receipts
in Basin
- Public grazing lands and forage crops feed cattle
- Hay also exported
- A-B buys barley
- Sugar beets and processing controlled by coop



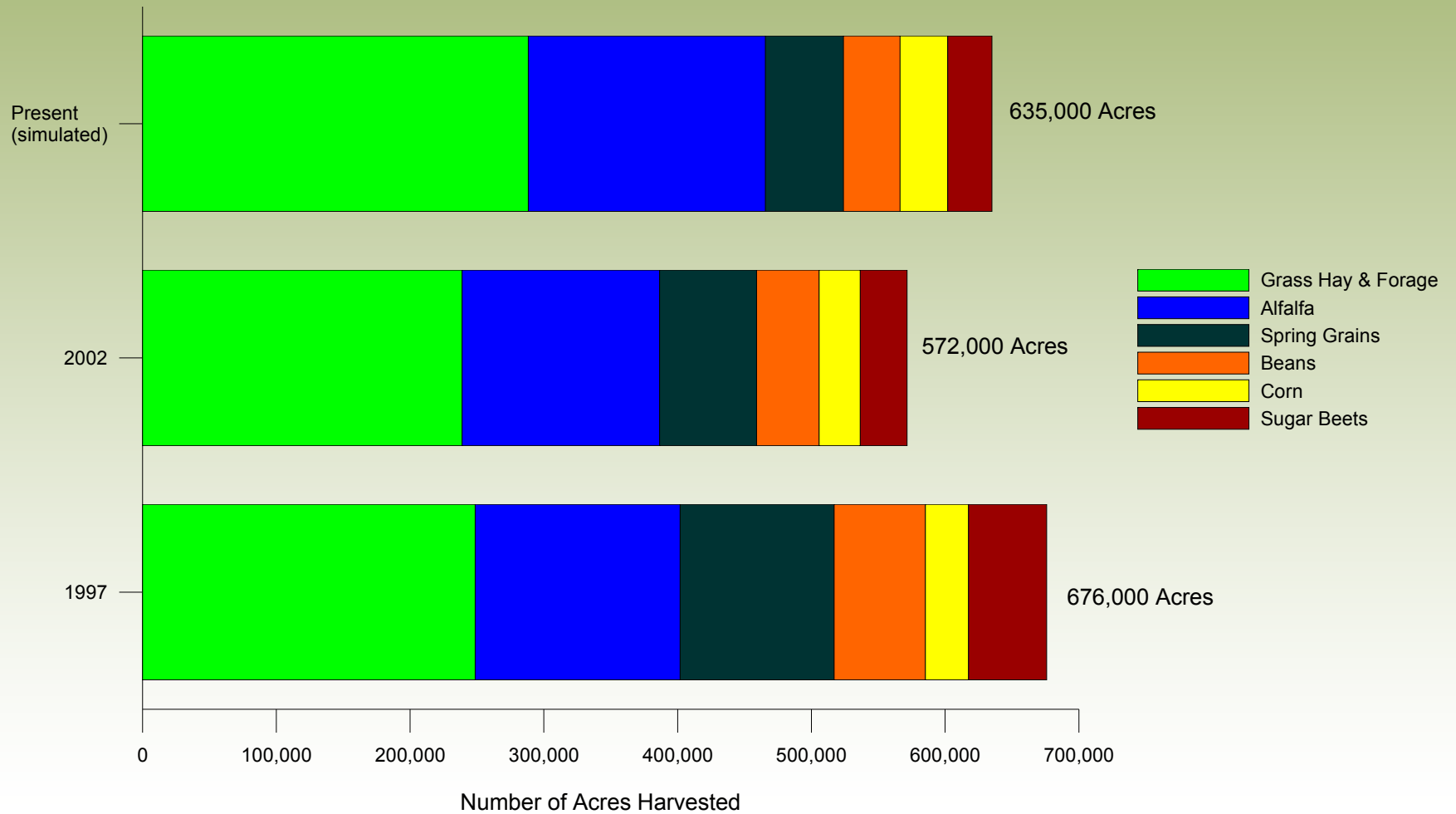
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Number of Cattle and Sheep in the Wind/Big Horn Basin, 2000 through 2008



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Acres by Crop Type in the Wind/Big Horn Basin, 1997-2007



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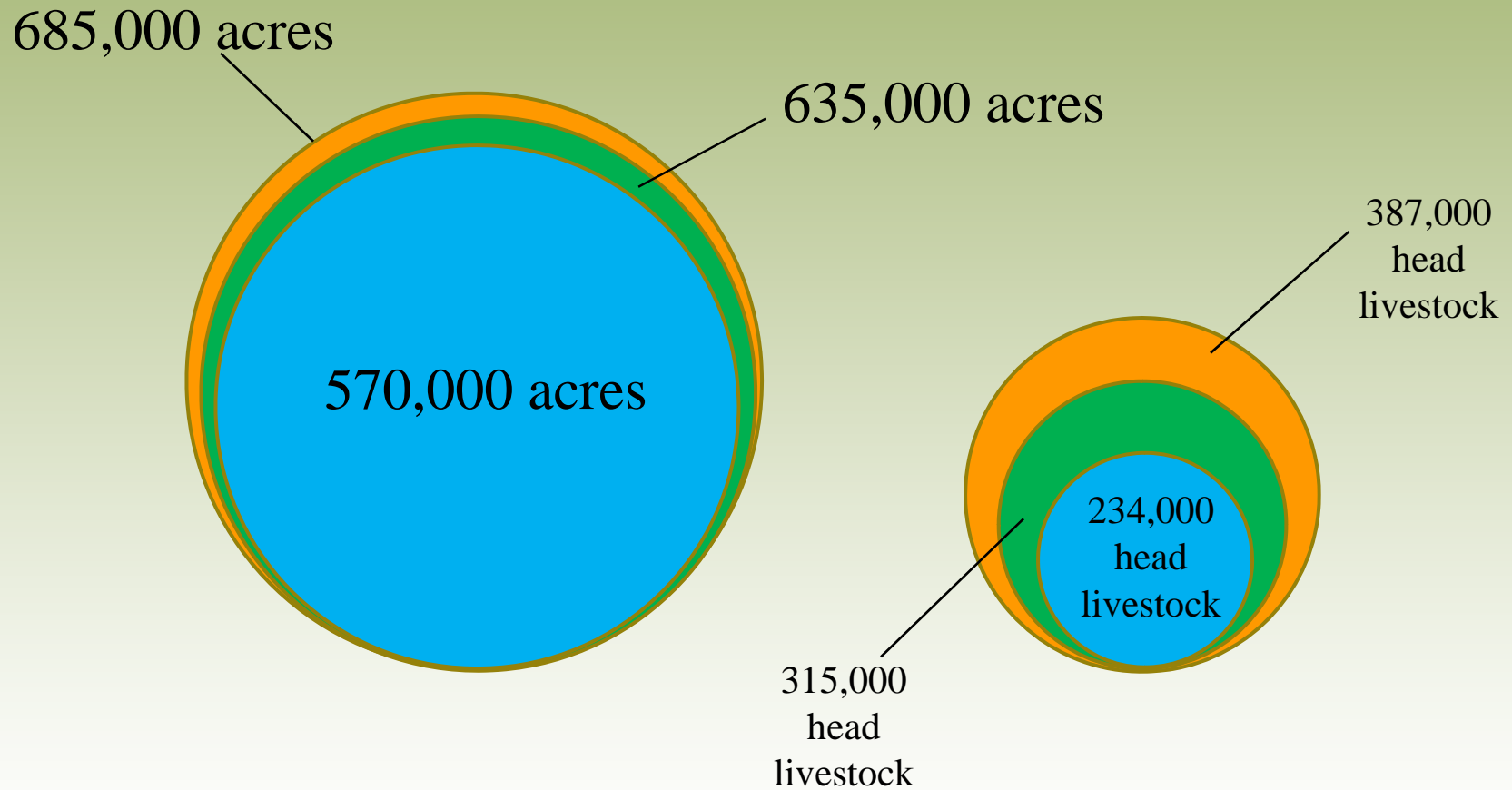
Influences and Assumptions for the Wind/Bighorn Agricultural Water Demand Projections through 2060

	<u>Low</u>	<u>High</u>	<u>Medium</u>
General Influences	Weak economic conditions U.S. and International Costs of production grow faster than prices Increasing ranchettes reduce agricultural intensity	Strong economic growth, U.S. and International Costs of production grow slower than prices Number of ranchettes stabilizes	Annual variations within narrow range long-term Costs of production balanced to prices Number of ranchettes stabilizes
Cattle	Authorized AUM's on public lands drop Grass and stubble remain poor	Authorized AUM's recover moderately Grass and stubble improve considerably	Authorized AUM's stabilize Grass and stubble improve somewhat
Crops	Crops and ag industry don't come back from recent drought/downturn Westside, ID project undeveloped Alfalfa and grass hay affected by cattle prospects Sugar demand declines, one mill closes	Crops and ag industry recover to pre-drought conditions Westside, ID project developed Alfalfa and grass hay affected by cattle prospects New sugar beet mill, more beets	Crops and ag industry stay at present levels Westside, ID project undeveloped Alfalfa and grass hay affected by cattle prospects Sugar beets stable, plant capacities unchanged



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Agricultural Acreage and Cattle Scenarios for the Wind/Big Horn Basin



Note: High scenario includes Westside Irrigation District Land Conveyance Project



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Current Conditions of Mining and Other Industry in the Wind/Big Horn Basin

<u>Mining/Ind. Sectors</u>	<u>2007 Annual Production</u>	<u>Recent Trends and Industry Conditions</u>
Petroleum	12.5M bbls 304M Mcf	Oil predominates Basin mining; oil and gas production expanded since 2000; sizeable gas reserves
Bentonite	1.6M tons	Declined from past levels, stable recently
Coal	443 tons	One operation, relatively small reserve base, mostly lower BTU
Uranium	None	Historically a major producer; some interest recently
Steam Power Plants	None	Limited by transmission access, nearby fuel production
Beet Processing	6,000 tons per day October through February	Two processing facilities currently operating at or near capacity.
Ethanol/Other	None	An ethanol plant began construction in Washakie County, but was dismantled. No other existing facilities



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Future Conditions of Mining and Other Industry in the Wind/Big Horn Basin

Future Prospects by Scenario

	Low	High	Medium
Petroleum	Stable	New technologies generate increasing production after 2030	Declines in BH Basin more than offset by increases in Wind Basin
Bentonite	Stable to declining	20% increase in output	Slight increase
Coal	Small operation closes	Two relatively small mines <300,000 tons/yr.	One operation continues, expands slightly
Uranium	No resumption	Three operations; industry reborn	One operation with moderate output
Power Plants	No new plants	One steam powerplant	No new plants
Beet Processing	Slight decline in acres/processing	Increased acreage/ one new processing facility	Steady output/processing
Ethanol/Other	No ethanol/biofuel production	One production facility for ethanol from cellulosic biomass (forest and primary mill residues)	No ethanol/biofuel production



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Tourism and Recreation Important to Wind/Big Horn Basin

Current Status

- Basin fishing, hunting, boating amount to 10% - 20% of State total
- \$479 million in 2008 visitor spending in Basins
- Cody and Park County a Gateway city to Yellowstone Park
- Lake recreation at Boysen and Buffalo Bill Reservoirs, other lakes
- National Outdoor Leadership School a major draw

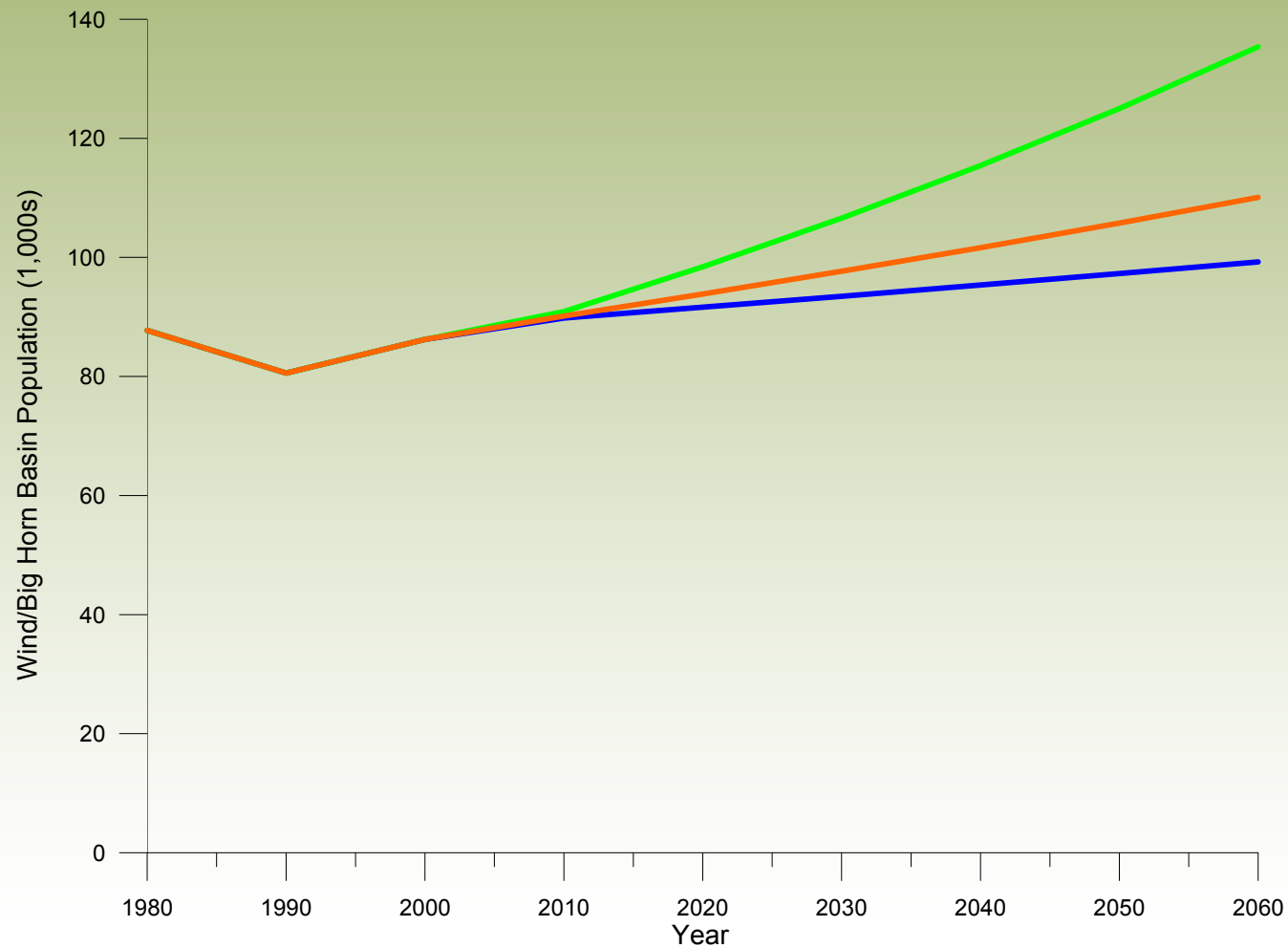
Future Prospects

- Generally well served
- Revitalized Sleeping Giant ski area
- Expanded lake and stream recreation opportunities always welcome



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Historic and Projected Population Growth for the Wind/Big Horn Basin



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Wind/Big Horn Basin Environmental Water Use, Acre Feet, Except as Noted

	<u>Current</u>	<u>Low</u>	<u>Medium</u>	<u>High</u>
Federal Reserve Rights				
Big Horn NF	43,500	43,500	43,500	43,500
Shoshone NF	605,600	605,600	605,600	605,600
Wyoming In-Stream Flow				
Existing	384,600 - 723,300	384,600	553,900	723,300
Applications	0	0	129,700	287,500
Wetlands, exc., Lakes and Ponds	228,900 acres	228,900 acres	228,900 acres	228,900 acres



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Wind River Indian Reservation Development Potential

- ✓ 108,000 acres in irrigated agriculture
- ✓ 500,000 acre-feet/yr. water diversions
- ✓ Available for use on reservation for agriculture or legally compliant subsumed uses



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Specific Tribal Opportunities for New Water Development

<u>Future Ag. Lands</u>	<u>Number of Acres</u>	<u>Non-Agricultural</u>
Arapahoe Canal	4,045	Bottled water plant
Big Horn Flats	2,752	Rangeland water system
North Crowheart	40,839	Potable domestic, fire protection
Riverton East	4,057	Small scale hydrogeneration
South Crowheart	<u>5,019</u>	Offstream storage, recreation, etc
		Other light industrial, commercial
		Cultural water uses
Total	56,712	Community parks and gardens

Sources: MWH 2009; and Northern Arapaho and Eastern Shoshone Joint Business Council, The Wind River Water Plan, Eastern Shoshone and Northern Arapaho Tribes, 2007



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Wind River Indian Reservation Water Development Assumptions for the Wind/Big Horn Basin Plan

Low Scenario – “Improve the Status Quo”

- Secure operation and maintenance funding for Wind River Irrigation Project (BIA); make existing project viable
- Complete rehabilitation work on Ray Lake
- Secure and improve existing irrigation systems



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Wind River Indian Reservation Water Development Assumptions for the Wind/Big Horn Basin Plan

High Scenario – “Futures lands fully developed for irrigation”

- 56,712 acres newly irrigated lands, 209,500 acre feet new diversions
- Some portion of total 500,000 acre feet tribal rights developed to fulfill Tribal Water Plan compliant with law



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Wind River Indian Reservation Water Development Assumptions for the Wind/Big Horn Basin Plan

Middle Scenario – “Low Scenario plus one major new development”

- Riverton East completed and fully operational
4,060 newly irrigated acres;
13,730 acre feet of new diversions
- Washakie Lake expanded



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Projected 2060 Water Diversions for the Wind/Big Horn Basin by Scenario Beyond Current Use (AF)

	<u>Low</u>	<u>Medium</u>	<u>High</u>
Current W/BH Basin Diversions	3,356,000	3,356,000	3,356,000
Agriculture	-323,000	No change	268,000
Mining*	36,000	106,000	150,000
Recreation (in place)	No change	No change	No change
Municipal and Domestic	1,800	3,900	8,700
Environmental (in place)	0	299,000	626,200
WRIR	0	15,000	209,500
Total Changes	-285,000	423,900	1,262,000
Future W/BH Basin Diversions	3,071,000	3,780,000	4,618,000

* Mostly groundwater



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