

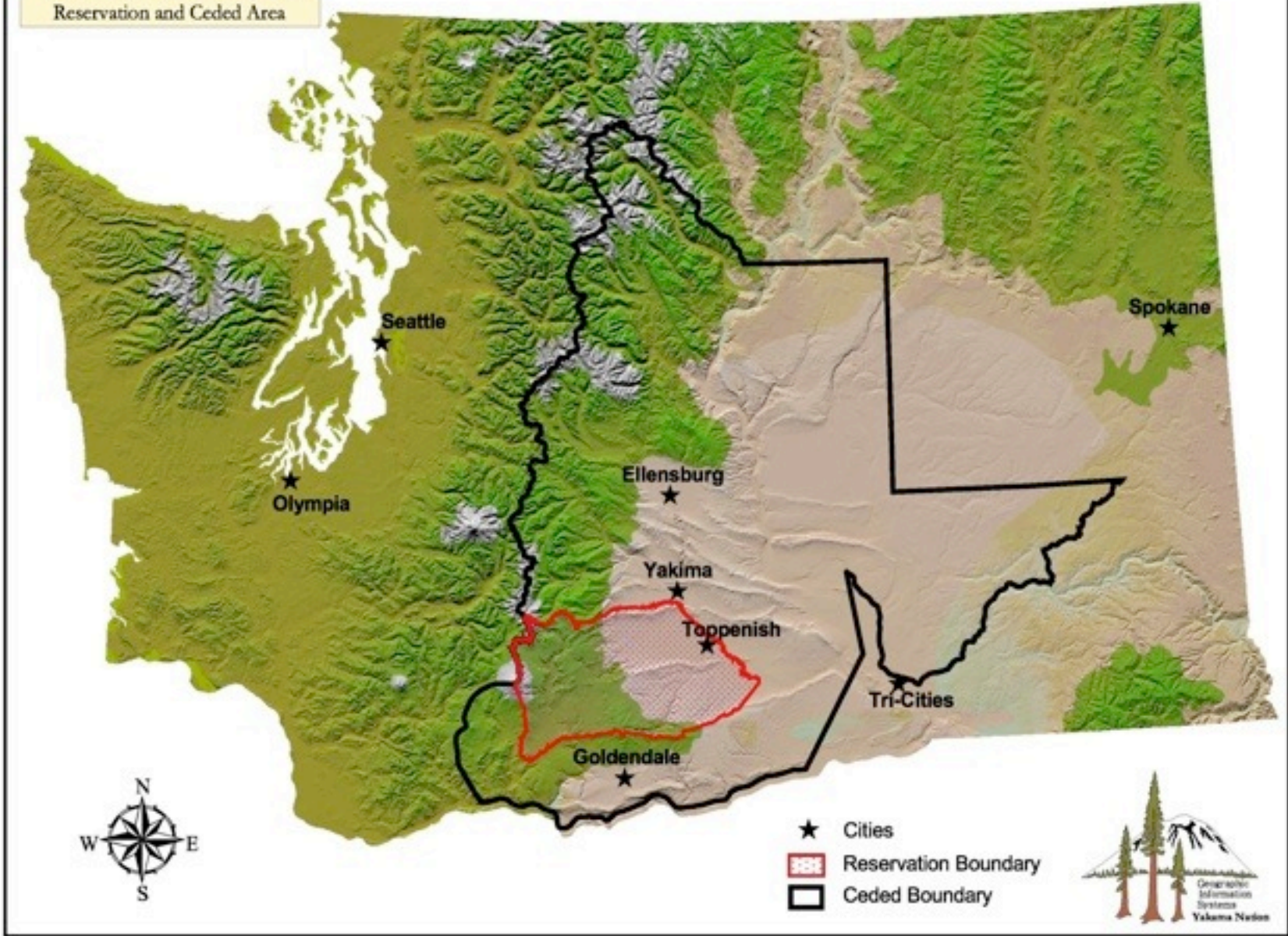
# **Yakama Power Utility and Renewable Energy Projects**

University of Washington

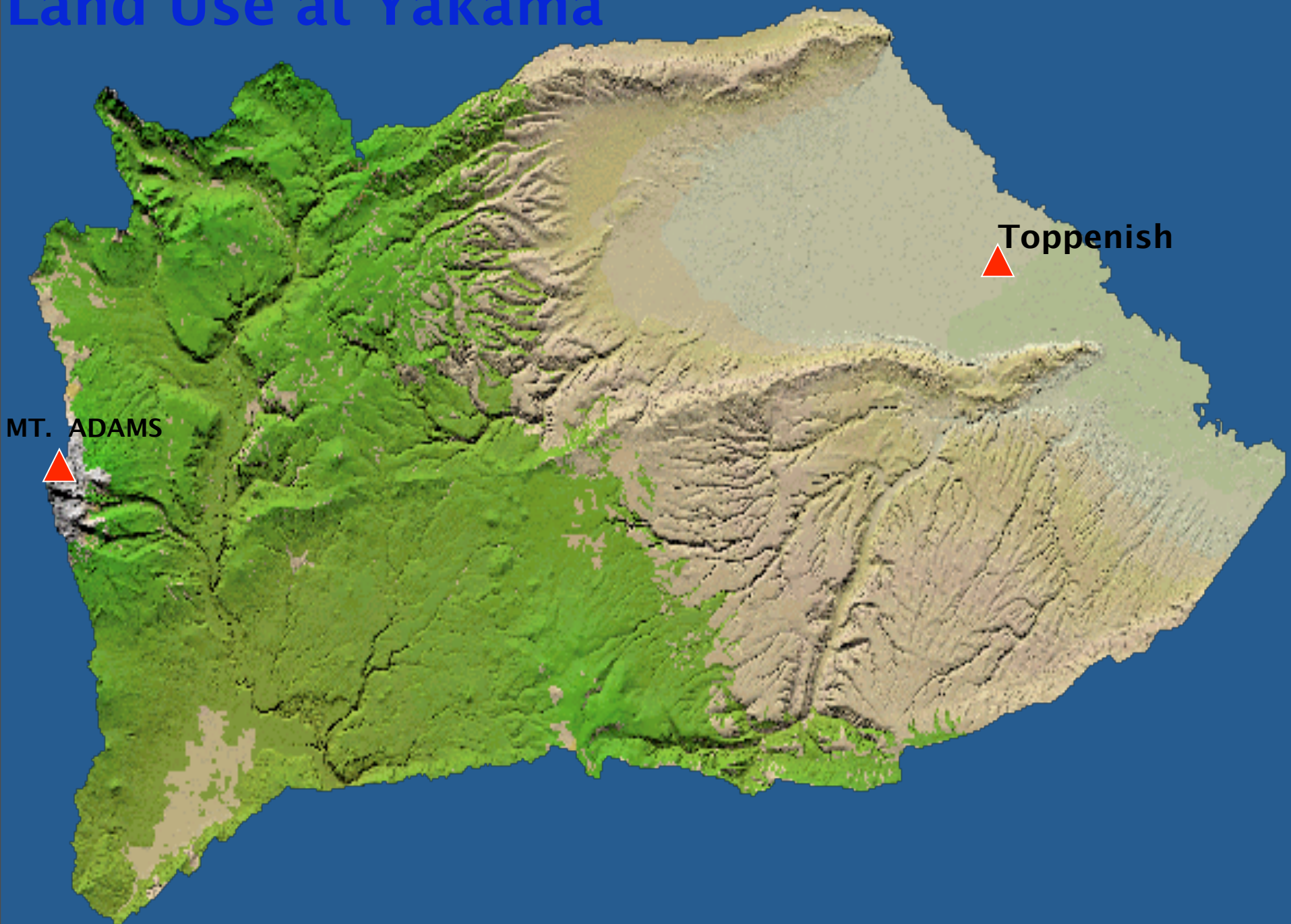
May 2010

# Yakama Nation

Reservation and Ceded Area



# Land Use at Yakama



# Land Use at Yakama

Agriculture 200,000 acres

MT. ADAMS

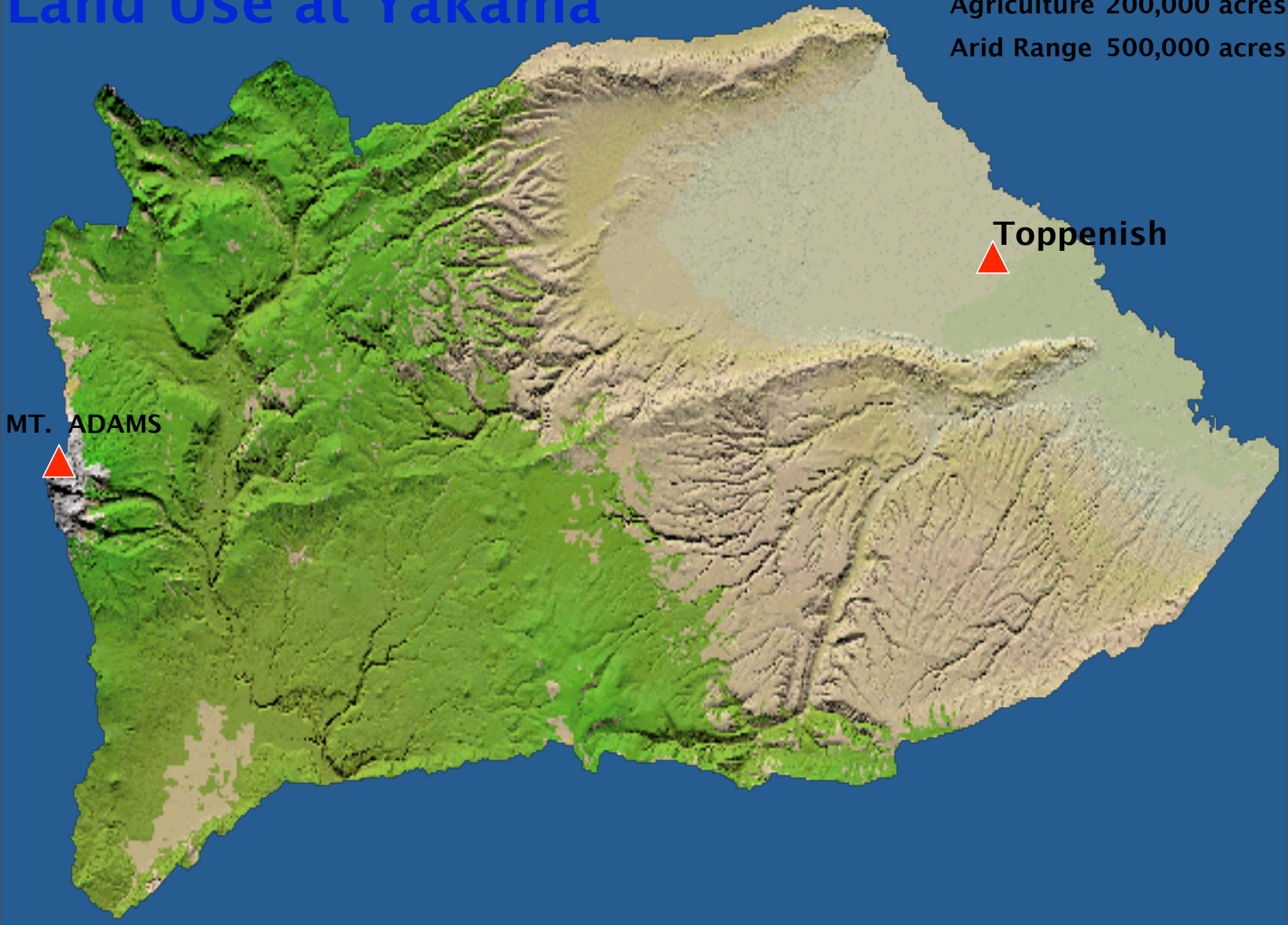
Toppenish



Tuesday, May 18, 2010

# Land Use at Yakama

Agriculture 200,000 acres  
Arid Range 500,000 acres



MT. ADAMS

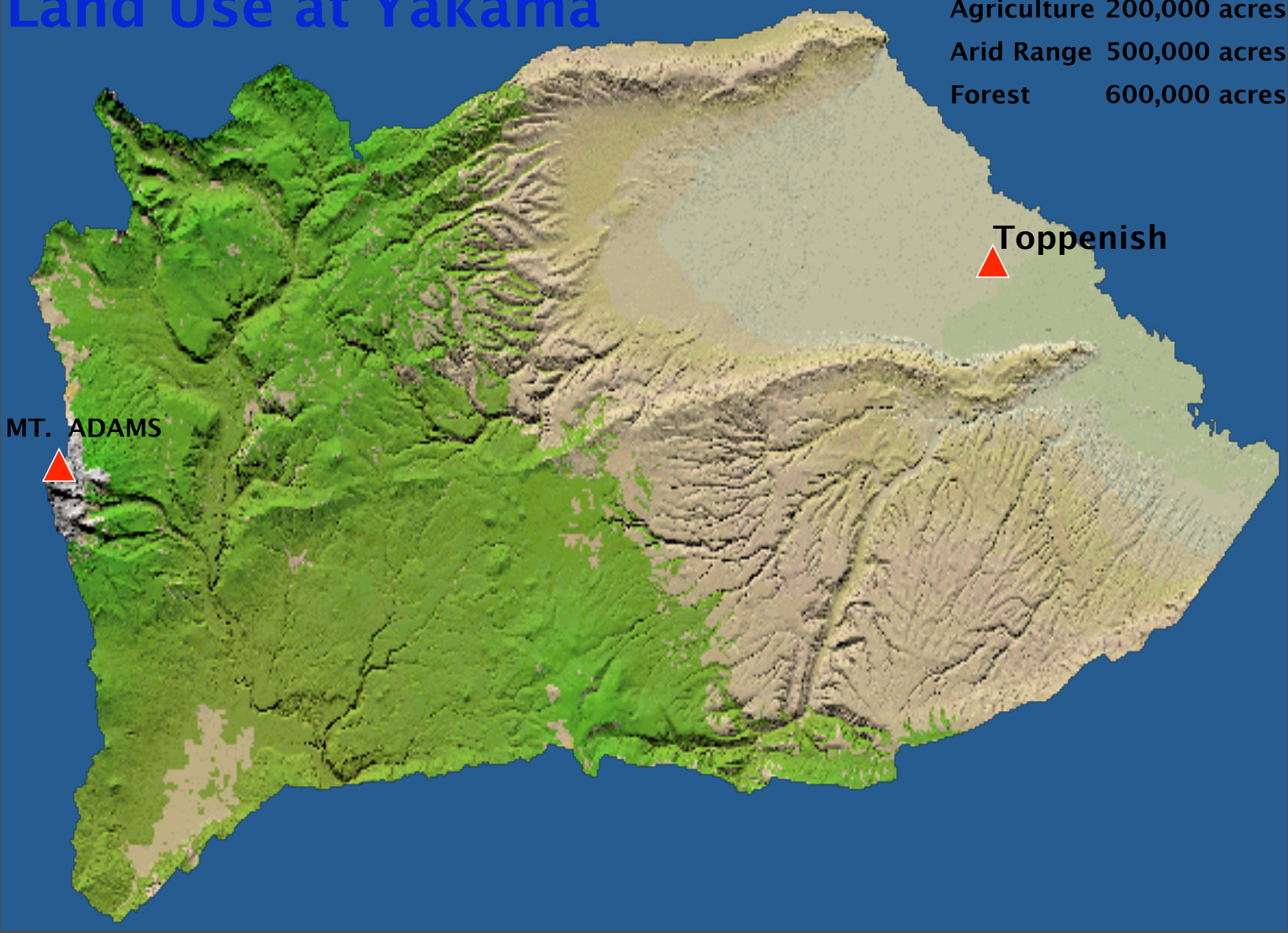
Toppenish

# Land Use at Yakama

Agriculture 200,000 acres  
Arid Range 500,000 acres  
Forest 600,000 acres

MT. ADAMS

Toppenish



# **YAKAMA POWER**



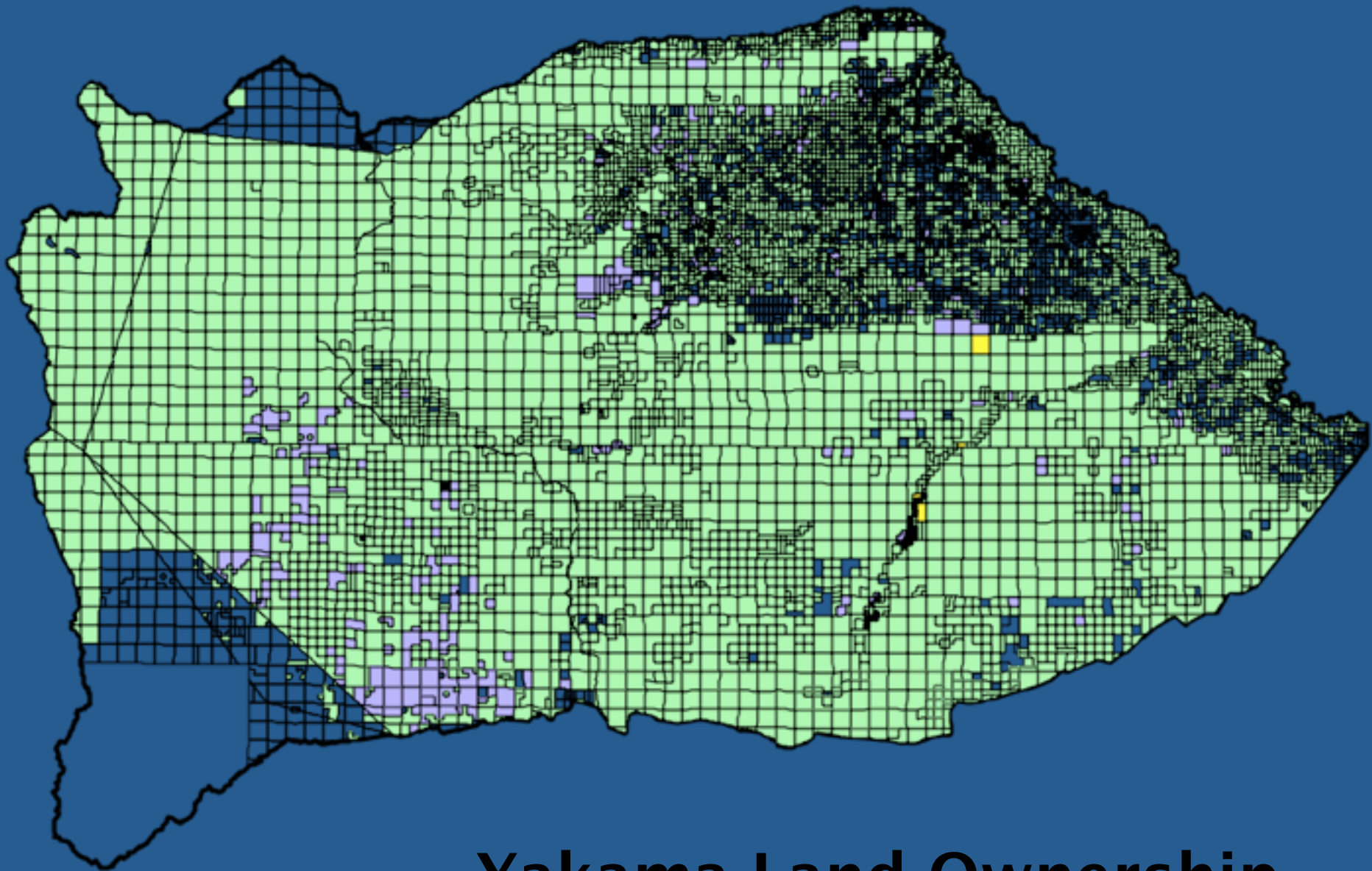
**A Enterprise of the Yakama Nation**

# YAKAMA POWER

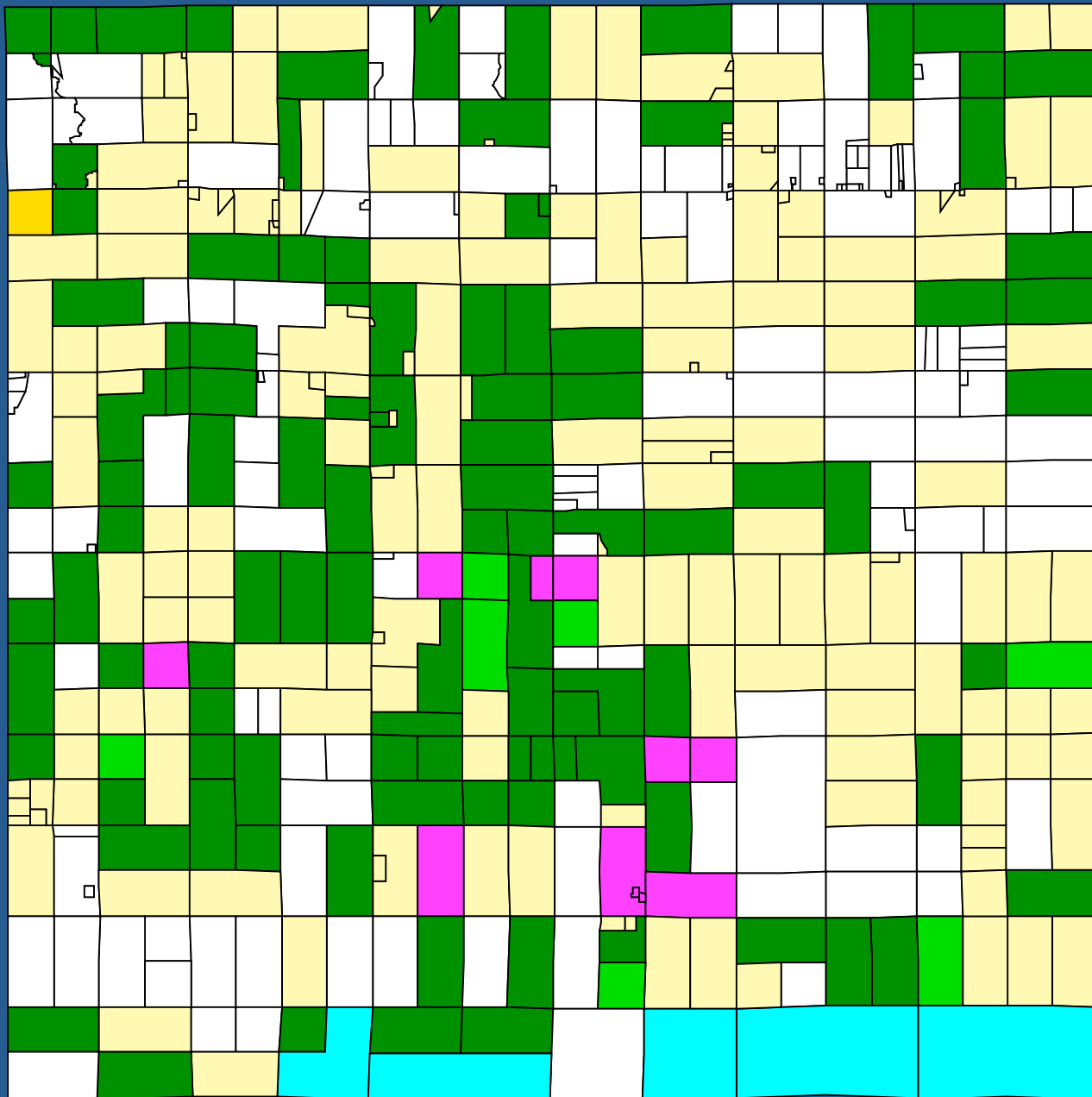


**A Enterprise of the Yakama Nation**





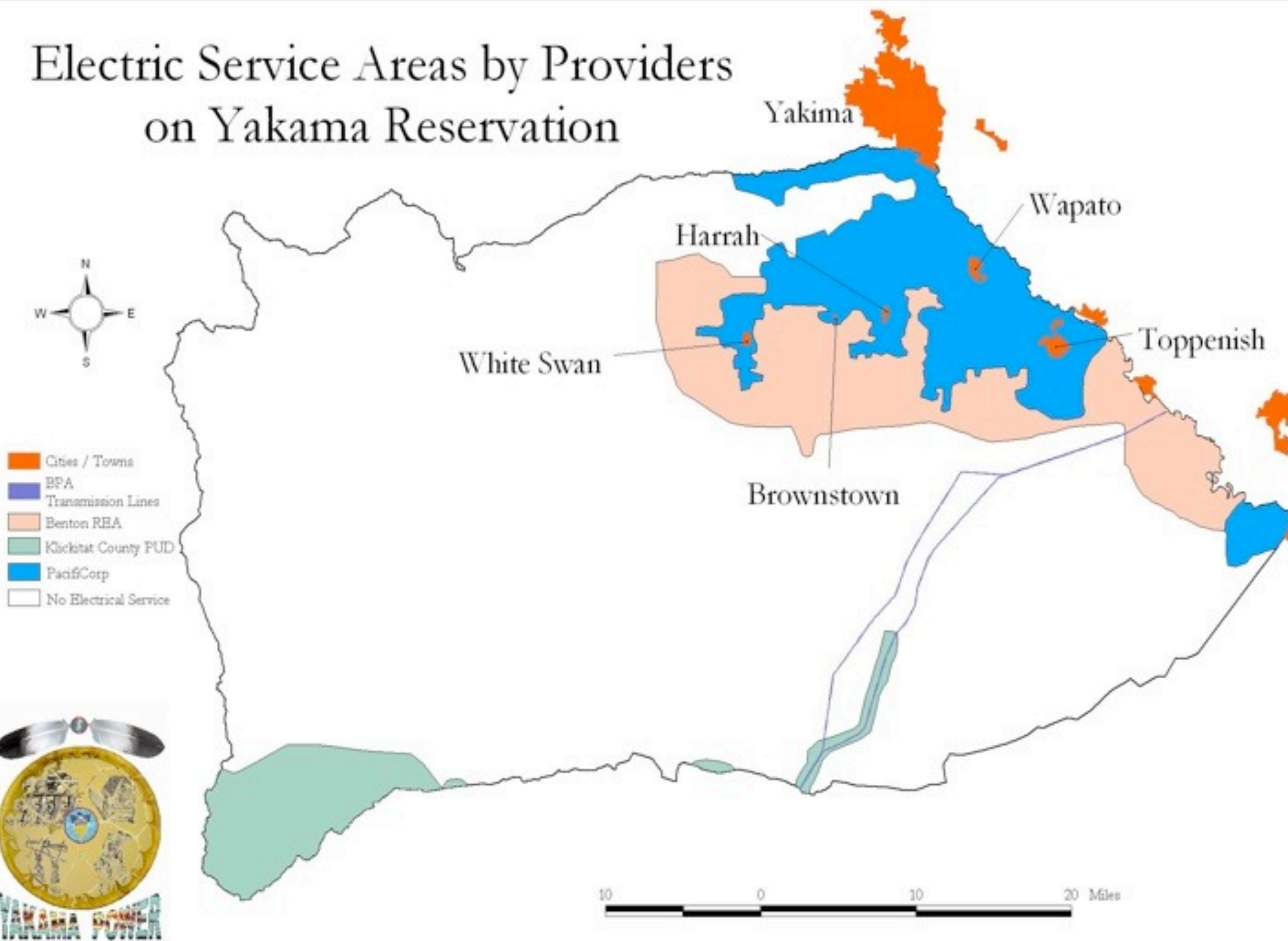
# Yakama Land Ownership



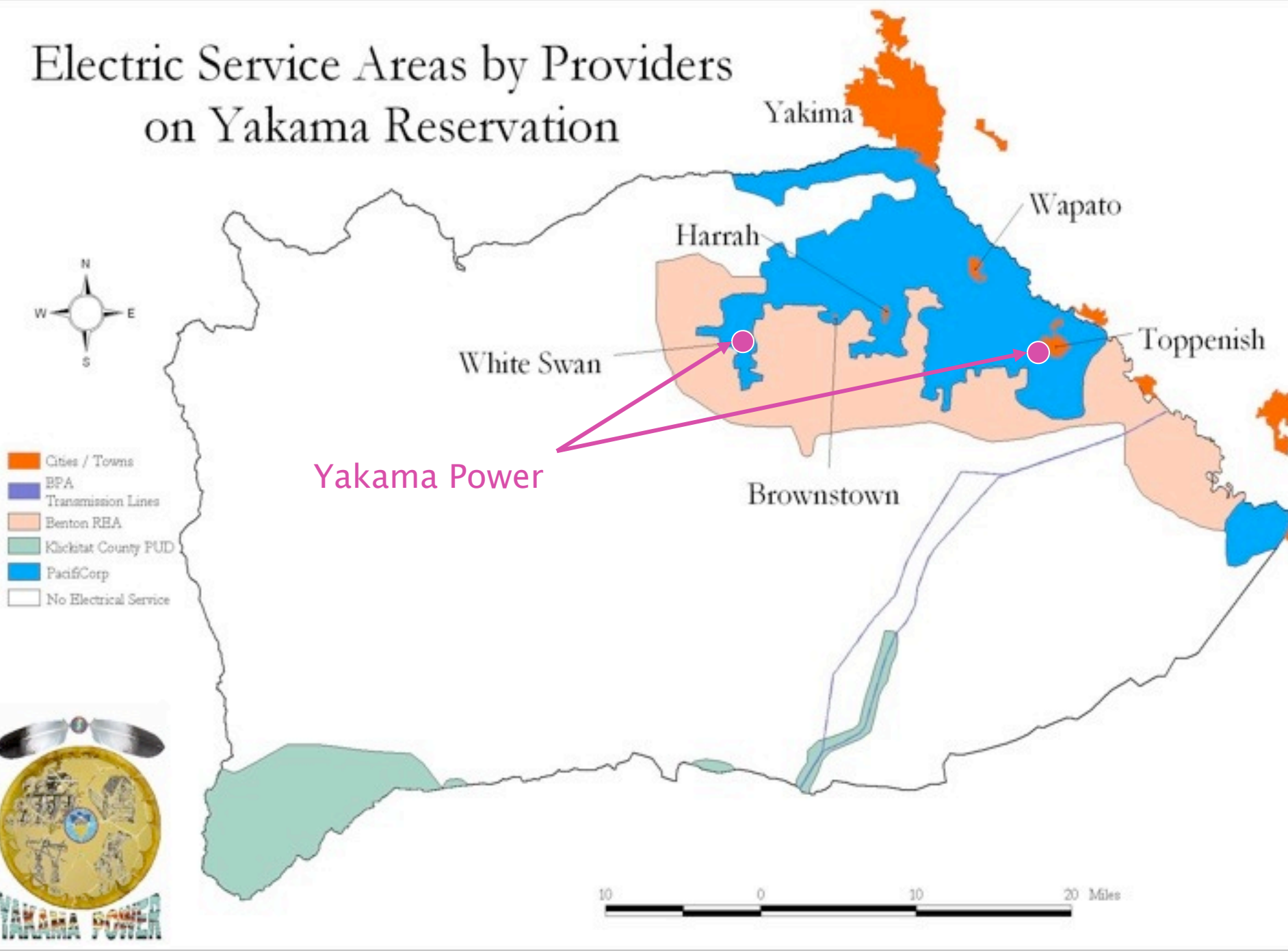
### Ownership

- Individual Tribal Member
- Yakima County
- Fee Simple Ownership
- Yakama Nation Fee
- Yakama Land Enterprise
- US Fish and Wildlife
- Tribal Ownership

# Electric Service Areas by Providers on Yakama Reservation



# Electric Service Areas by Providers on Yakama Reservation





Tuesday, May 18, 2010



## Mission Statement

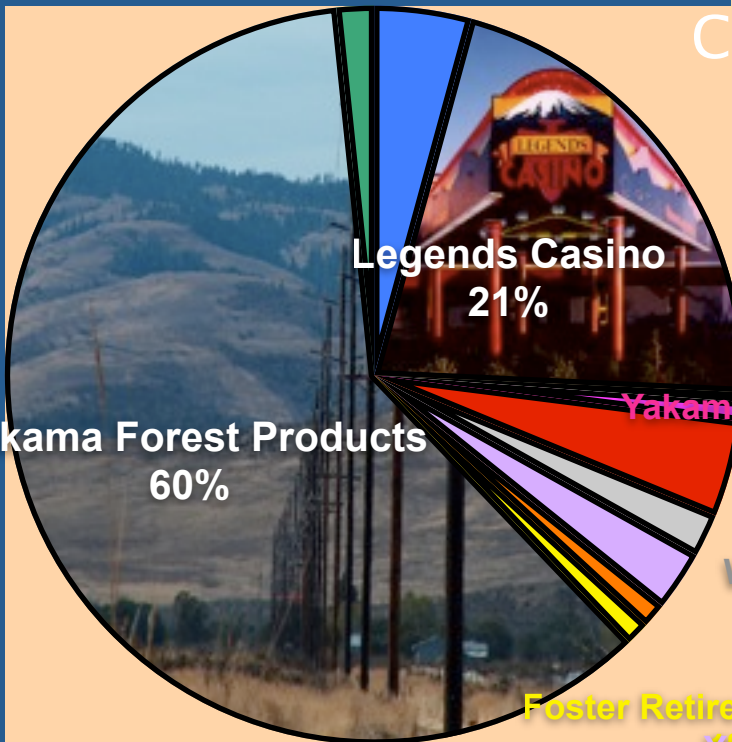
To Provide affordable and reliable electric energy that will enhance the quality of life for its customers and provide a stable, safe, and competitive work environment for its employees.



## BPA Standards for Service

- 1) Be legally formed in accordance with local, state, Federal or tribal laws;
- 2) own a distribution system and be, willing and able to take power from BPA within a reasonable period of time;
- 3) have a general utility responsibility within the service area;
- 4) have the financial ability to pay BPA for the Federal power it purchases
- 5) have adequate utility operations and structure; and
- 6) be able to purchase in wholesale amounts.

# Yakama Power Customers



Yakama  
Power

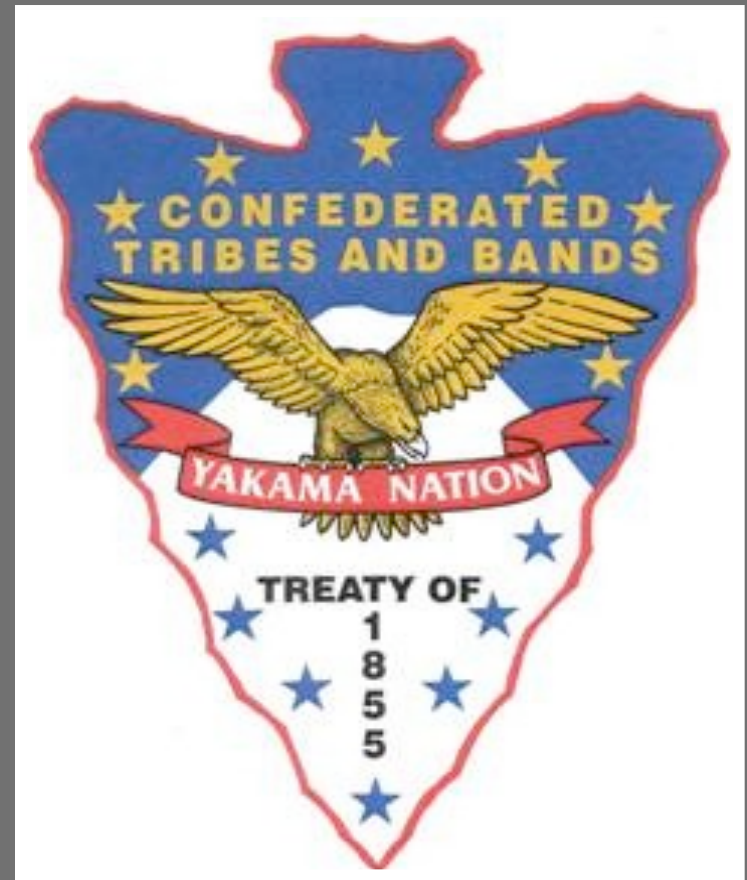
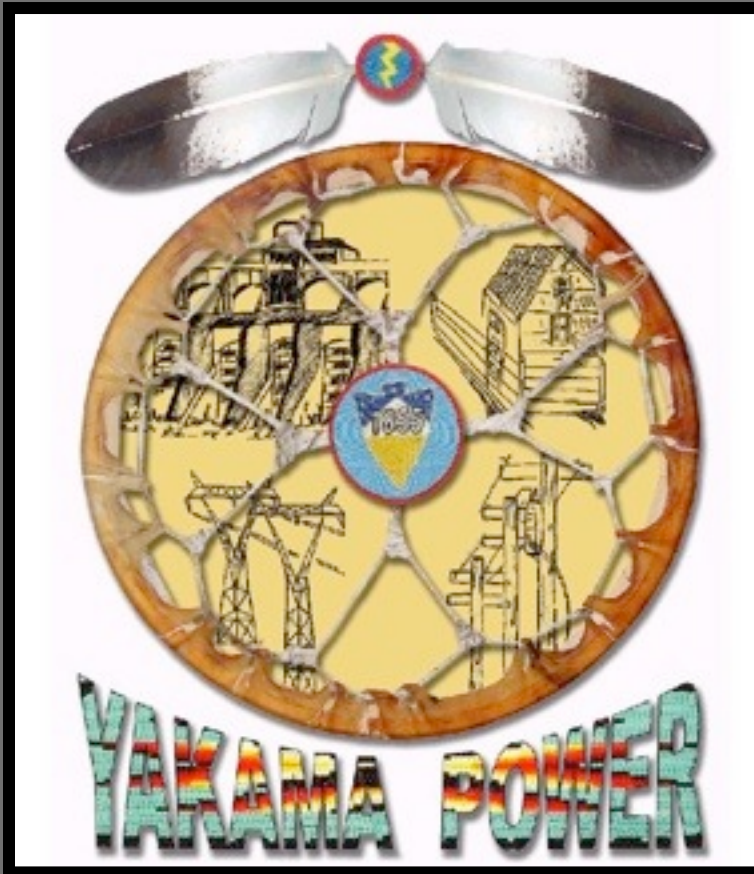
Customers







**Yakama Power and Bonneville Power Administration sign a new 20 year power sales agreement on December 1, 2008**



Grant County  
**PUBLIC UTILITY DISTRICT**



**YAKAMA POWER T-259**



# YAKAMA POWER T-259



**YAKAMA POWER T-259**



Tuesday, May 18, 2010

**YAKAMA POWER T-259**



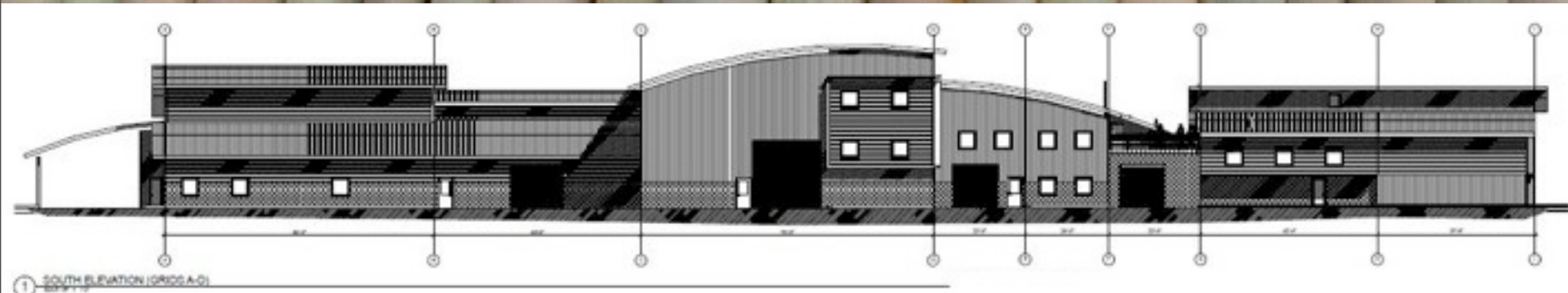
# **YAKAMA POWER T-259**



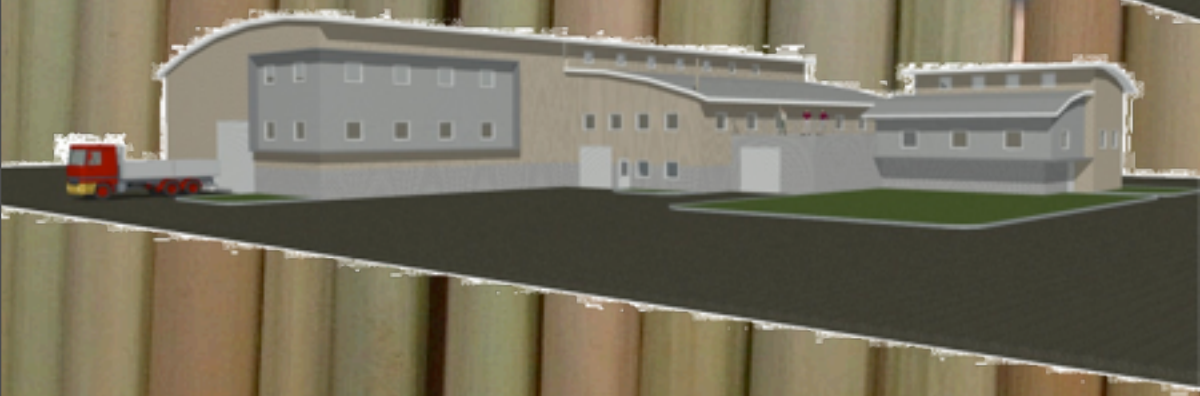
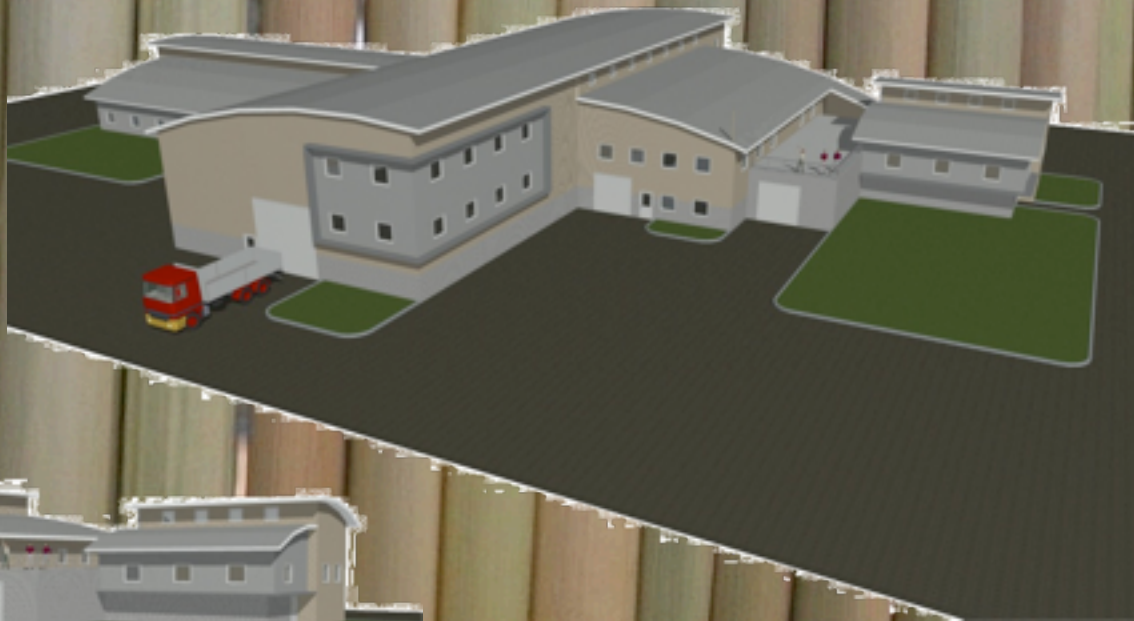


**YAKAMA POWER T-259**





# Operations and Warehouse Building



Drawn by: Tony Monroe an enrolled Yakama member



# Utility Equipment and Parts



# Utility Equipment and Parts





# Utility Equipment and Parts





# Utility Equipment and Parts





# Yakama Power's Apprentice Lineman Program



# Building Infrastructure





# Wapato Irrigation Project



Drop # 2 Powerhouse



## Power Generation



Drop # 3 Powerhouse





*Drop 2 Model Plant*



# Drop 2



Tuesday, May 18, 2010



Tuesday, May 18, 2010



# Cultural Awareness





## Drop 2 Opening Ceremony

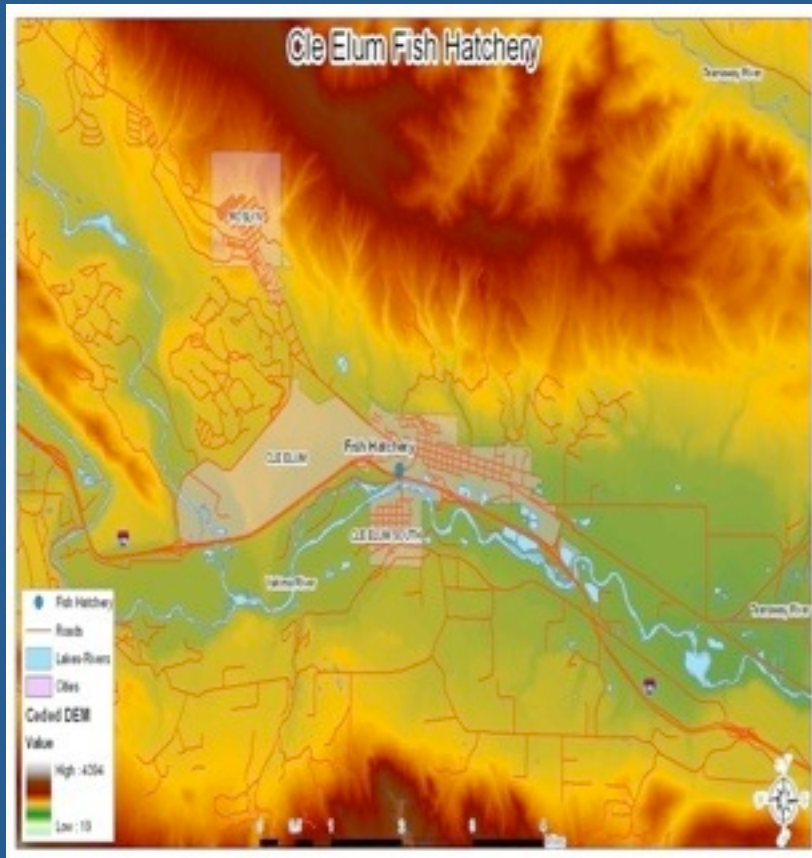


# Drop 4

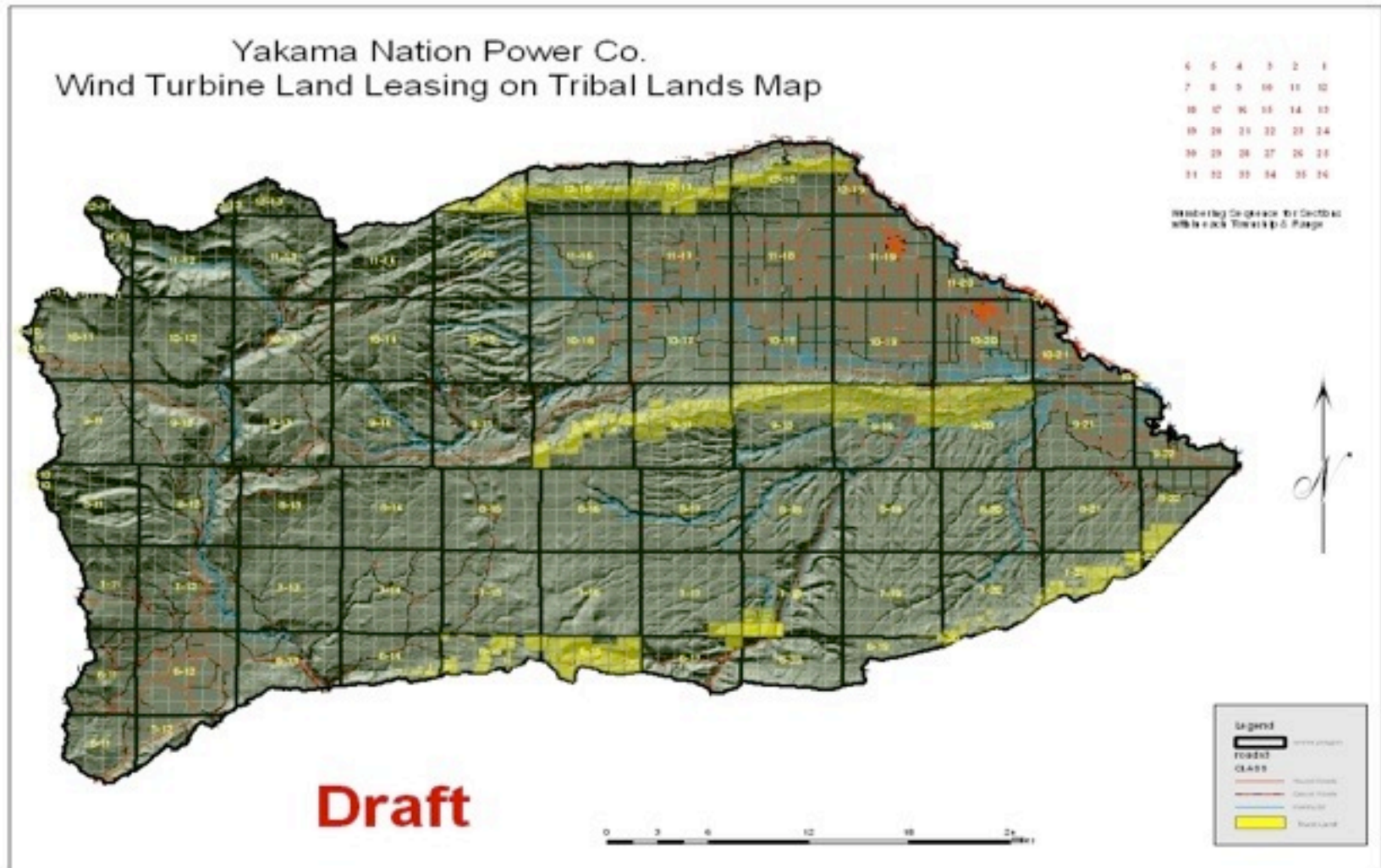




# Other Potential Low Head



# Wind Development Land





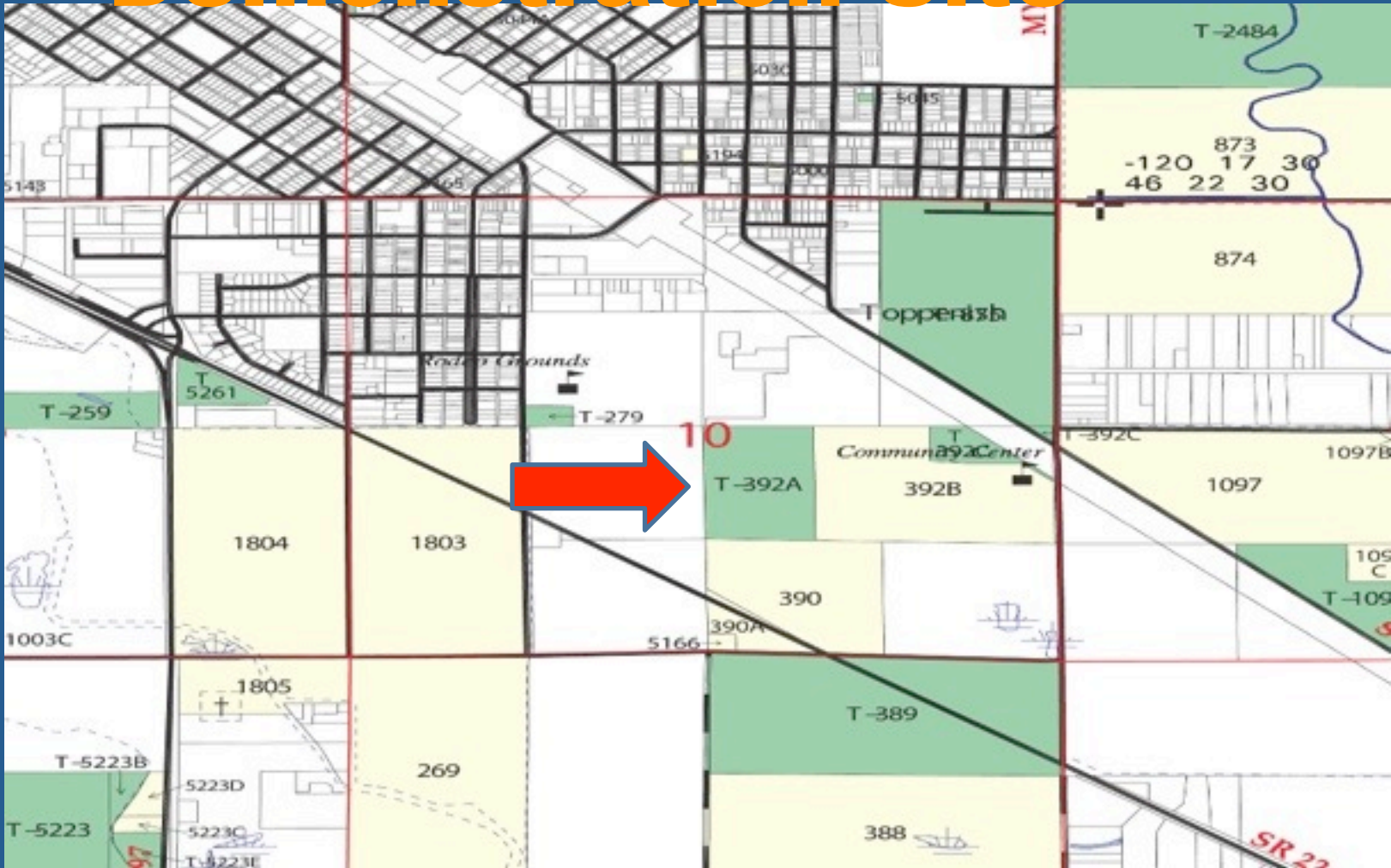
ABOVE: Yakama Tribal Council Vice-Chairman Sam Jir visits a Yakama Power wind monitoring site on Alatum Ridge on Wednesday.

Photo by NREY GARDNER/Thomas Hawk Photo

# Yakama Power Wind



# YP Wind Demonstration Site



# Current Options with



# UW Study

Emissions factors for biomass relevant to the Yakama energy project

Process		%Moisture	Emissions (lbs generated/ BDT of fuel)				
			PM	PM2.5	PM10	Nox	CO
Open Burning of Biomass Residue	Forest Slash	50%	24	16	20	10	148
	Fruit tree trimmings	50%	12	NR	NR	10	98
	Russian olive	20%	7.5	NR	NR	6.25	61.25
Controlled Combustion	Combustion boiler, no control	0%	8	7	6	6	10
	Mechanical Collector	0%	5	5	3	6	10
	Wet Scrubber	0%	1	1	1	NR	NR

# UW Study

Emissions factors for biomass relevant to the Yakama energy project

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# Renewable Energy-Woody Biomass Power Generation



# Tapash Sustainable Forest

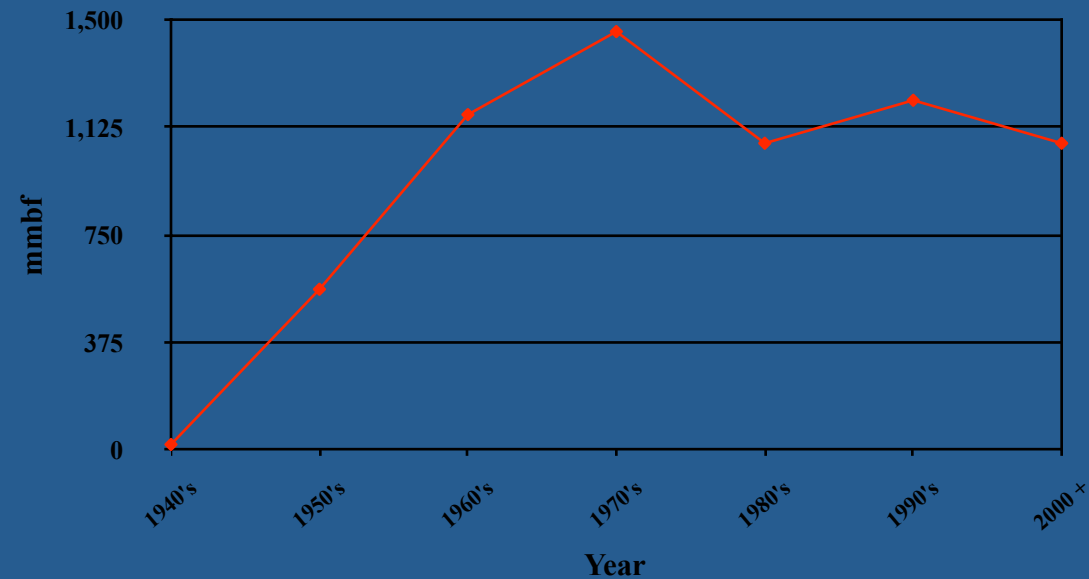
Biomass Type	Potentially Available (PDT/YR)	Practically Available (PDT/YR)
Timber Harvest Residuals	299,210	179,100
Manufacturing Residuals	202,180	81,060
Urban Wood	76,730	50,820
Tributary Urban Wood	686,320	411,790
Agriculture	173,900	87,000
Fuels Treatment	662,400	338,800
<b>Totals</b>	<b>2,100,740</b>	<b>1,148,570</b>

# Timber Sales on the Yakama Reservation

- 1940's: 18 mmbf
- 1950's: 560 mmbf
- 1960's: 1,170 mmbf
- 1970's: 1,460 mmbf
- 1980's: 1,070 mmbf
- 1990's: 1,220 mmbf
- 2000 – 2006: 1,070 mmbf



Volume Harvested per Decade





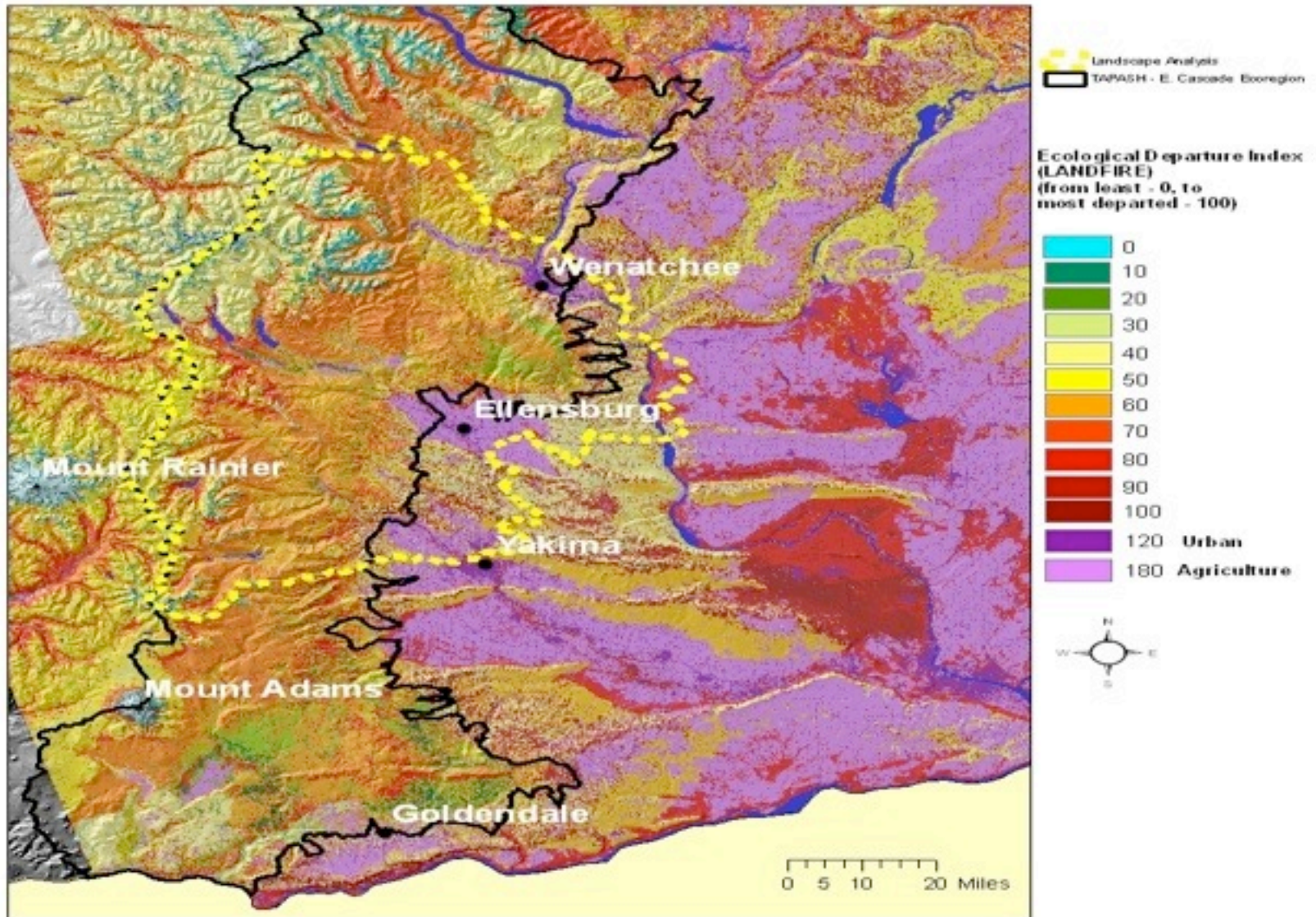
## Russian Olive Wildlife Effects

- Aggressive weed – crowds out native vegetation
- Provides little value to native wildlife species
- Removal is a priority to restore wildlife habitat

# Forest Health



# Tapash Sustainable Forest Collaborative Extent Ecological Departure Index



Map created by The Nature Conservancy  
February 20, 2008  
Land Fire Data Final Version

# Sustaining and

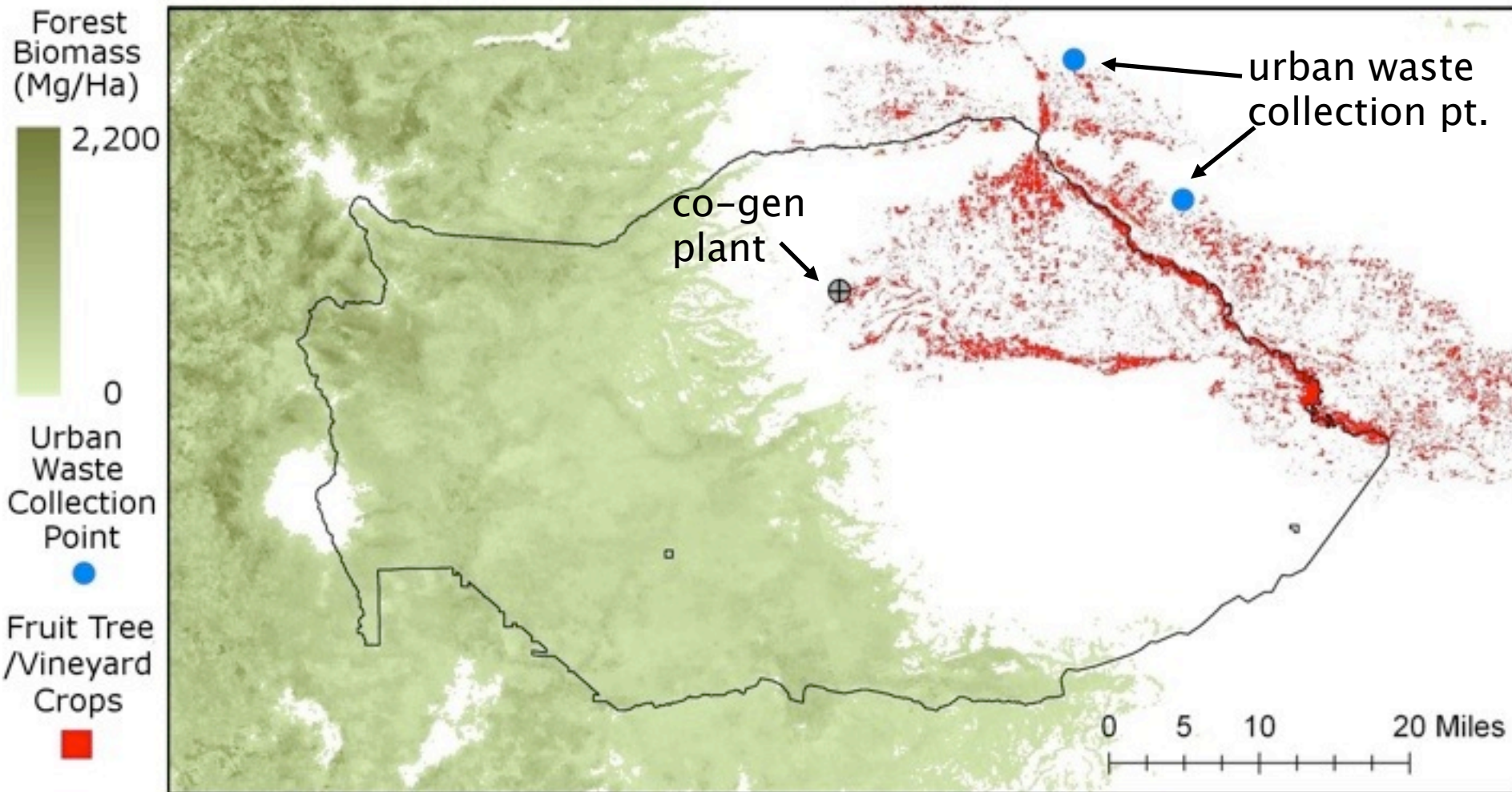




# Yakama Nation Woody

- Convert Yakama Forest Product's Oil Burning Dry Kiln Boilers to Wood Burning Boiler
- New 20 Megawatt Woody Biomass Power Plant in Sunnyside or Satus

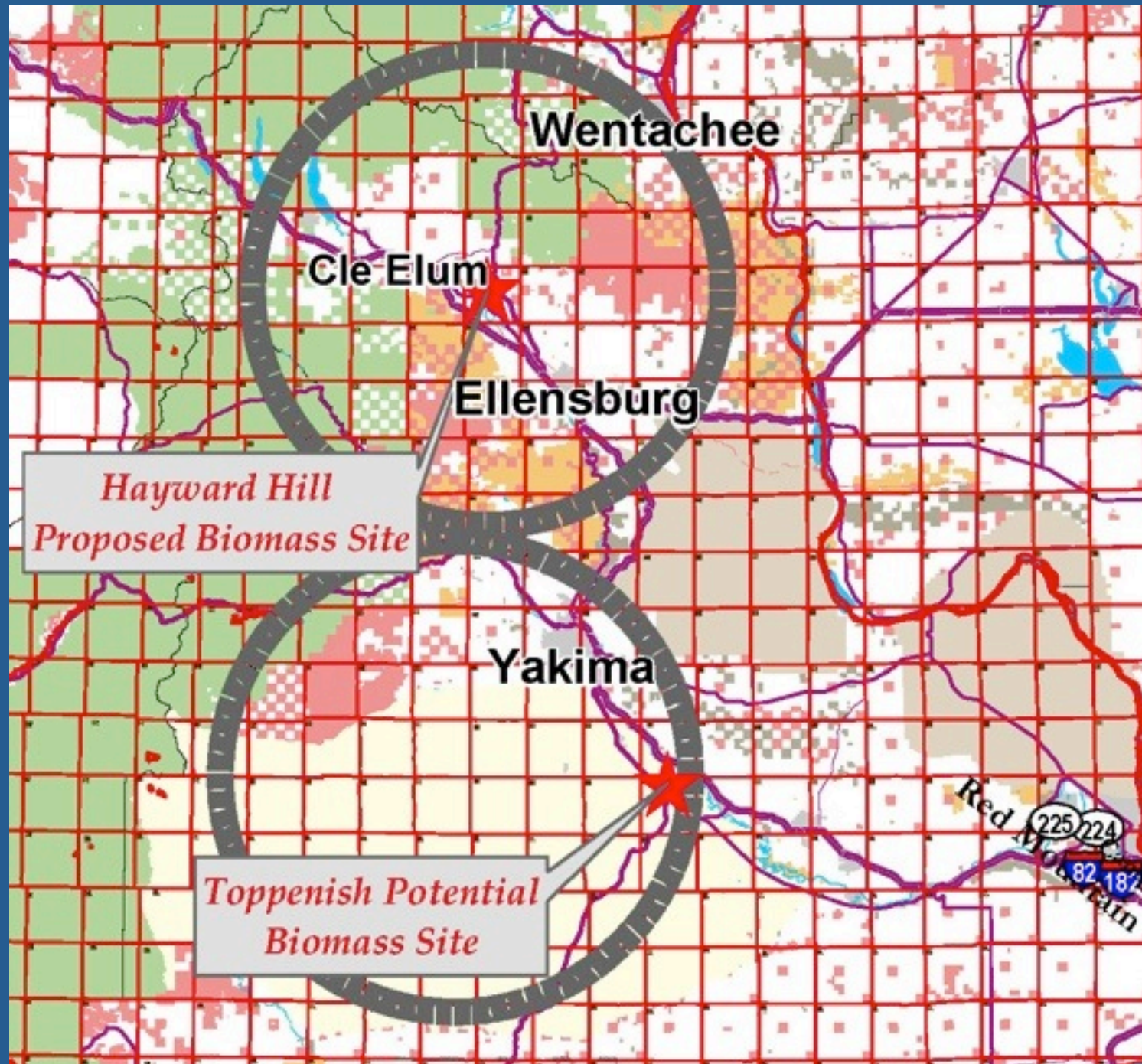
# Biomass Inventory Map



## Data Sources:

Online resources from Landsat, USDA, Yakima County, Western Governors Association

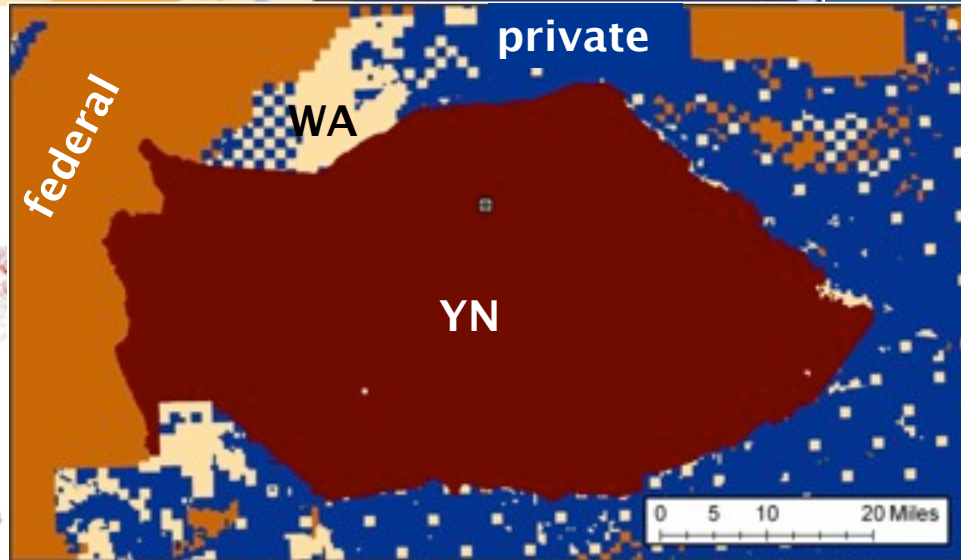
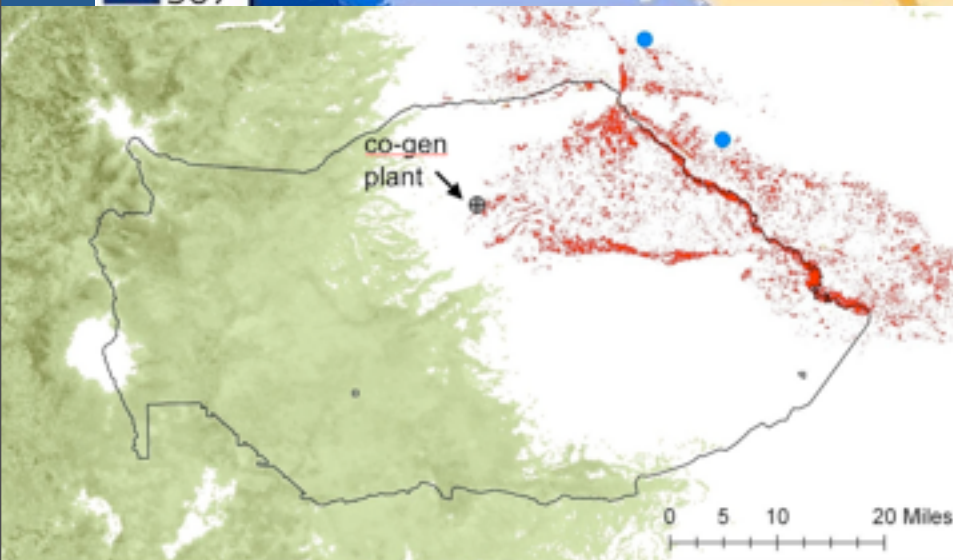
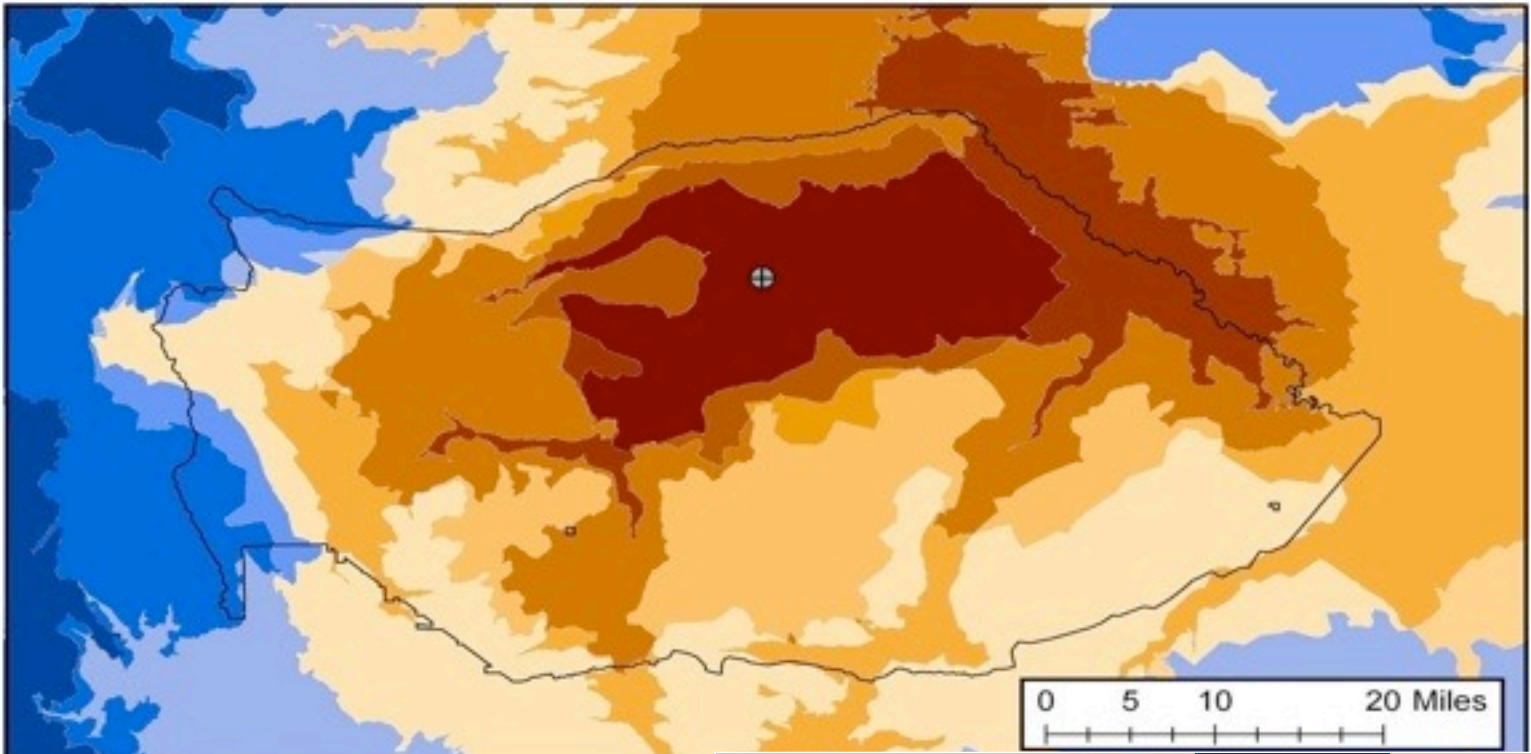
Blackard, J.A., et al., Mapping U.S. forest biomass using nationwide forest inventory data and moderate-resolution information, *Remote Sensing of Environment*, 2008, 112(4): p.



# Transportation Cost Map

Legend  
\$/RT

- 64
- 87
- 107
- 130
- 150
- 153
- 173
- 176
- 196
- 198
- 216
- 219
- 239
- 241
- 262
- 264
- 284
- 307



# Equity & Financing

- New Market Tax Credits–39% Investment, get tax incentive, low income community receive equity after 7 years.
- Renewable Energy and Tribal Economic Development Bonds
- Federal, State, and Private Grants
- Volunteer Carbon Credits

# Yakima Resource Boiler

- 1963 Boiler–Can be donated to YP for tax incentives
- No power generation capacity
- Would fit nicely with what YFP needs for dry kilns
- \$6.7 million to move from Yakima to White Swan
- YN DNR is applying for grants to assist in the capital cost

# Yakama Forest Products

- **Small Sawlog Mill: 35 mmbf/yr (<14.5" dbh)**
- **Large Sawlog Mill: 80 mmbf/yr capacity**
- **Employs 350 people – more than 90%+ members/  
decent/family**



<http://www.yakama-forest.com/>

# Yakima Resources Boiler





# Back to the Drawing Board

## PROGRAM OVERVIEW

### Federal Energy Management Program

## Program Overview

### Energy Savings Performance Contracts (ESPCs)

*If you're doing all you can to meet your agency's energy efficiency, water conservation, and renewable energy goals but are frustrated by a lack of funds, then a Super ESPC could be the answer.*

Executive Order 13423 of 2007 and EISA 2007 set new federal energy goals:

- Cut energy use (compared to 2003) by 3% per year in 2007 through 2013
- Increase use of renewable energy to not less than 3% of total electricity use in 2007 – 09, not less than 3% in 2010 – 12, and not less than 7.5% in 2013 and thereafter, with at least half from new sources in each year
- Reduce water use by 2% per year, 2008 – 2013

#### ESPCs Make Energy and Cost Savings Pay for Improvements

An ESPC is a contracting vehicle that allows agencies to accomplish energy projects for their facilities without up-front capital costs and without special Congressional appropriations to pay for the improvements.

An ESPC project is a partnership between the customer and an energy services company (ESCO). The ESCO conducts a comprehensive energy audit and identifies improvements that will save energy at the facility. In consultation with the agency executive, the ESCO designs and constructs a project that meets the agency's needs and arranges financing to pay for it. The ESCO guarantees that the improvements will generate savings sufficient to pay for the project over the term of the contract. After the contract ends, all additional cost savings accrue to the agency. Contract terms up to 25 years are allowed.

#### Super ESPCs Streamline the Process

Super ESPCs are indefinite-delivery, indefinite-quantity (IDIQ) contracts established by DOE to make ESPCs as practical and cost-effective a tool as possible for agencies to use. These "umbrella" contracts were competitively awarded to ESCOs who demonstrated their capability to provide energy projects to federal customers. The general terms and conditions are established in the IDIQ contracts, and agencies implement projects by awarding delivery orders to the Super ESPC ESCOs. Agencies can implement a Super ESPC project in far less time than it takes to develop a stand-alone ESPC project.

#### Congress and the President Encourage Agencies to Use ESPCs

Congress and the President encourage agencies to use ESPCs to finance and implement efficiency improvements and meet their energy goals. Legislation authorizing ESPCs was enacted in 1990, and DOE promulgated regulations for their use in 1995. Super ESPCs were placed to streamline the process in 1998, and the ESPC authority was made permanent by the Energy Independence and Security Act of 2007.

More than 400 ESPC projects have been awarded by 19 different federal agencies in 47 states. About \$2.3 billion has been invested in U.S. federal facilities through ESPCs, saving over 18 trillion Btu annually, equivalent to the energy used by a city of over one half million.



The Naval Base Coronado's solar power system, financed through an ESPC, is one of the largest federal solar power installations in the nation. The solar installation covers an impressive half-mile parking structure and is made up of 3,079 photovoltaic panels.

The grid-connected system reduces the Navy's electrical load and strain on San Diego's electric operating system, as well as the region's transmission and distribution system.

#### TWO KINDS OF SUPER ESPCS

##### Regional "General-Purpose" Super ESPCs

The entire United States, and all U.S. Territories are covered by Regional Super ESPCs.

The Super ESPC ESCOs are listed at [www.eere.energy.gov/femp/financing/superespcs\\_escos.html](http://www.eere.energy.gov/femp/financing/superespcs_escos.html)

Regional Super ESPCs are intended for projects based on a wide variety of proven energy efficiency and conservation measures. Super ESPC ESCOs have demonstrated their capabilities with the following:

- Boiler and chiller plant improvements

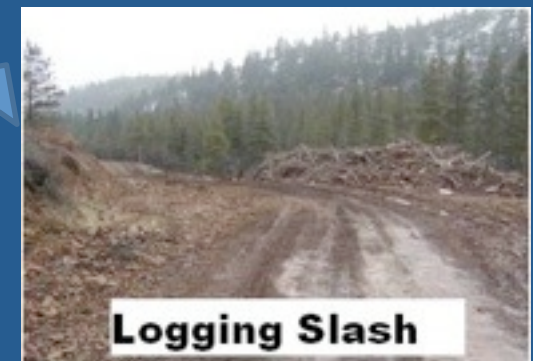


U.S. Department of Energy  
Energy Efficiency and Renewable Energy

Energy.gov is a program that helps you to plan, invest, create, and affordably



# Yakama Power Biomass





Yakama Power  
Toppenish, Washington

Biomass Cogeneration System  
Capital Cost Estimate

**DRAFT**

Jacobs Engineering Project No. 25LL8400

BY

JACOBS ENGINEERING GROUP INC.  
PORTLAND, OREGON  
503/624-3000

December 12, 2008

THIS REPORT HAS BEEN EDITED TO REMOVE PROPRIETARY  
AND CONFIDENTIAL INFORMATION. SENSITIVE TEXT AND  
DATA HAS BEEN DELETED.

### WOOD FUEL SUPPLY ASSESSMENT FOR A COMMERCIAL-SCALE BIOMASS POWER COGENERATION PROJECT AT WHITE SWAN, WASHINGTON

Prepared for:

Grant County PUD  
P.O. Box 878  
Ephrata, WA 98823

Prepared by:

TSS Consultants  
2724 Kilgore Road  
Rancho Cordova, CA 95670



April 2008

Wood Supply Assessment for Commercial-Scale Biomass  
Power Cogeneration and Biomass Utilization Projects in  
Central Washington

Prepared for:

The Tapash Sustainable Forest Collaborative



and

South Central Washington Resource Conservation and  
Development Council



Prepared by:

TSS Consultants  
2724 Kilgore Road  
Rancho Cordova, CA 95670



March 2009

#### YAKAMA FOREST PRODUCTS

White Swan, WA

#### WOOD FIRED BOILER

#### FEASIBILITY

#### STUDY

Yakima Energy  
4414 S Colville Ln  
Besse, Idaho 83716  
Sheldon Schuler, P.E.  
January 28, 2010

#### Resource Assessment and Biomass Supply Costs Estimates for White Swan, Washington

Jeffrey Richardson<sup>1</sup>, Ken Spier<sup>2</sup>, Vikram Lant<sup>3</sup>, Dana Eggle<sup>4</sup>, Gary York<sup>5</sup>, David Hickey<sup>6</sup>,  
Brenda Berke-Gonzalez<sup>7</sup>, Robert Conrad<sup>8</sup> and David T. Schwartz<sup>9</sup>

#### Biomass-based Energy for Sustainable Forestry Program

<sup>1</sup>College of Engineering  
School of Forest Resources  
University of Washington  
Seattle, WA 98195

and  
<sup>2</sup>Yakima Power  
P.O. Box 1279  
Ephrata, WA 98848

#### Executive Summary

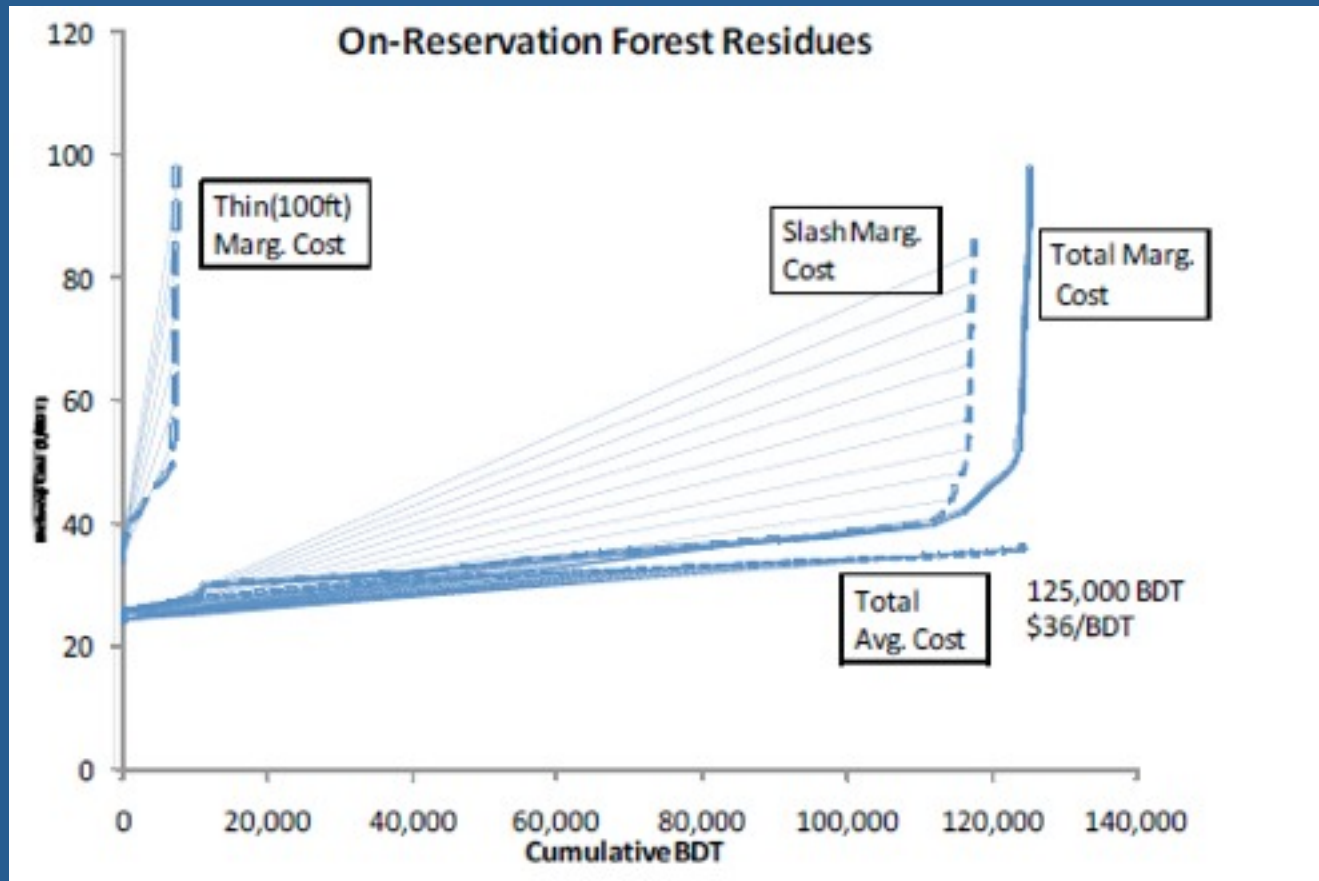
We have evaluated a wide range of biomass resources on the Yakama Reservation and in  
Besse, Grand, Ephrata, Colville, and Yakima counties for possible use as a biomass-fired power  
plant at White Swan. Property ownership conditions and wood storage, forest and agriculture  
inventory data, and field work were used to create specific project biomass resources.  
Estimated costs included the labor and equipment needed to chip, load, transport, and unload the  
biomass. The resource profile in zoning units were included (zoning units are usually better for  
the biomass as evidenced) use were the cost or quality of fuel resources included in the analysis.  
(These preliminary numbers need to be stressed separately from Yakama Power Resources). Initial  
screening identified logging units, whether those that transportation, storage and nearby work, that  
will use machinery, and provide good biomass resources in the short producing woody  
biomass sources. We found that the 7 county region can provide approximately 20,000 tons dry  
ton (SDT) of woody biomass per year at an average cost of \$14/SDT, significantly exceeding  
the needs of a 11 MW power facility. Access to the biomass requires reviewing with Tribal,  
State, and Federal forest managers, general jurisdiction, and private sites, as well as an analysis on  
and off the Yakama reservation. The total biomass resources on the reservation are  
approximately 170,000 SDT per year at an average cost of \$10/SDT. The on-reservation  
resources are mainly from forest residues (77%) and residual biomass (23%). Major  
restrictions in these counties include our recognition that the maximum electricity output of  
11 MW is less than the Yakama reservation forest, and that it costs \$11/SDT to chip,  
load, and unload. We also found that restricted availability of the biomass will eliminate large  
quantities of SDT biomass as potential, currently produced for the open pile burning of these  
residues. Other studies have estimated that 1.1 jobs are produced per MW of power generated in  
a biomass-fired facility, suggesting that the 11 MW power facility will add over 12 jobs.

<sup>9</sup>Address correspondence to: David T. Schwartz, dtss@wsp.wa.edu  
Charles A. Engineering, University of Washington, Seattle, WA 98195-1719

# UW Bioenergy IGERT



# University of Washington





Tuesday, May 18, 2010



# Traditional Knowledge & Western Science





# Developing



# Yakama Nation Goals

- Self Sufficiency
- Sustainability
- If We Take Care of the Land, Water, & Air, It Will Take Care of Us

Yakama Power generates electric energy and power to serve the electric utility needs of the Yakama Nation Reservation. - Mozilla Firefox

File Edit View History Bookmarks Tools Help

Main MyUW Page Yakama Power generates electri...



# YAKAMA POWER

Yakama Mi X't'uuwit



Home About Us Savings Tips Safety ID Theft prevention Contact Us

## AFFORDABLE AND RELIABLE

> X't'uuwit awa Tinmami "Power to the People"



RESIDENTIAL SERVICES

COMMERCIAL SERVICES

EMPLOYMENT



DISTRIBUTION



GENERATION



CUSTOMER SERVICE



YAKAMA NATION

### ANNOUNCEMENTS

Dec 03, 2009  
**Hydro Plant Tours**  
 To schedule contact Lennette  
 509-865-8400

### Our Mission

Yakama Power's mission is to provide affordable and reliable electric energy that will enhance the quality of life for its consumers and provide a stable, safe and competitive work environment for its employees. This mission will be accomplished by having devoted employees and by the use of sound management, operating, engineering and financial practices.

### Our Commitment



## W.I.P.

Toppenish Wapato White Swan

**Toppenish, WA**  
 99086

Done

start Yakama Power gener... (0:40) 5:33 PM

# Thank You

