

Feather River Coordinated Resource Management Watershed Restoration Monitoring



Plumas-Lassen Administrative Study Research Seminar

April 21, 2011

Kara Rockett

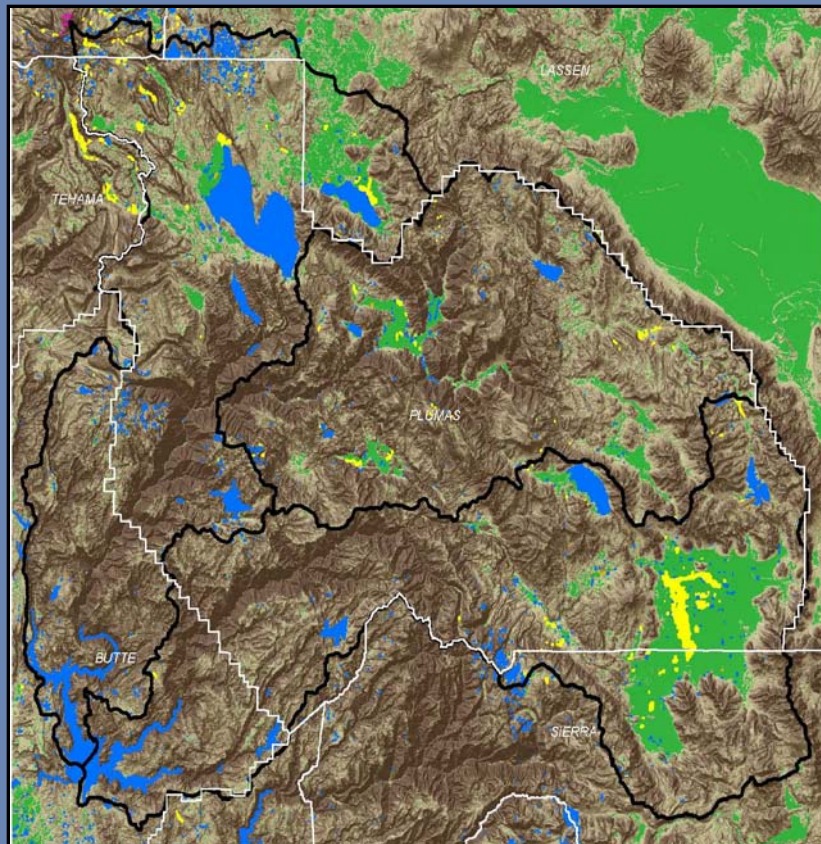
Feather River CRM Signatory Agencies

24 Federal, state and local, public and private agencies and groups

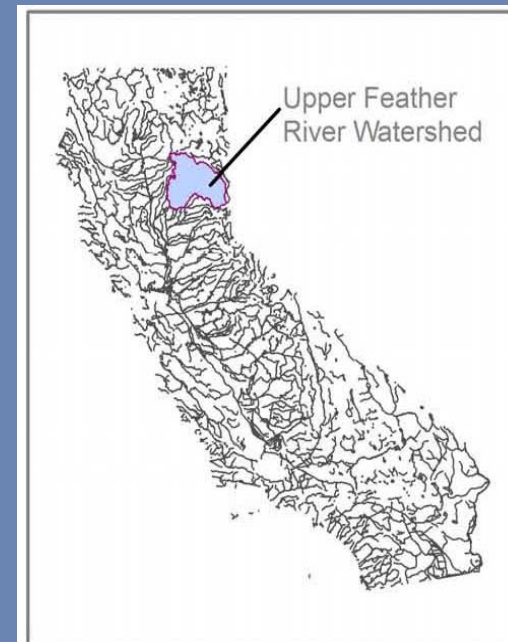
- **Plumas National Forest**
- **Natural Resource Conservation Service**
- **North Cal-Neva Conservation and Development Area**
- **US Army Corps of Engineers**
- **USDA Farm Services Agency**
- **US Fish & Wildlife Service**
- **Feather River RCD**
- **Feather River College**
- **PG&E**
- **Salmonid Restoration Federation**
- **Trout Unlimited**
- **Plumas Corporation**
- **Department of Conservation**
- **Calif. Dept. Fish & Game**
- **Calif. Dept. Forestry & Fire Protection**
- **State Parks and Recreation**
- **Calif. Dept. of Transportation**
- **Calif. Dept. Water Resources**
- **Regional Water Quality Control Board**
- **UC Cooperative Extension**
- **Sierra Valley RCD**
- **Plumas County**
- **Plumas County Community Development Commission**
- **Plumas County Unified School District**

Feather River CRM Mission Statement

“To protect, maintain and enhance ecosystems and community stability in the Feather River Watershed through collaborative landowner participation.”



3,222 sq mi



Restoration

FRCRM focus- Reestablishing stability and proper hydrologic function in headwater meadows by reconnecting channels with historic floodplains.

Techniques:

Riffle Augmentation



Pond and Plug

Boulder Vane Bank Stabilization



FR-CRM Restoration



- **1985 – present**

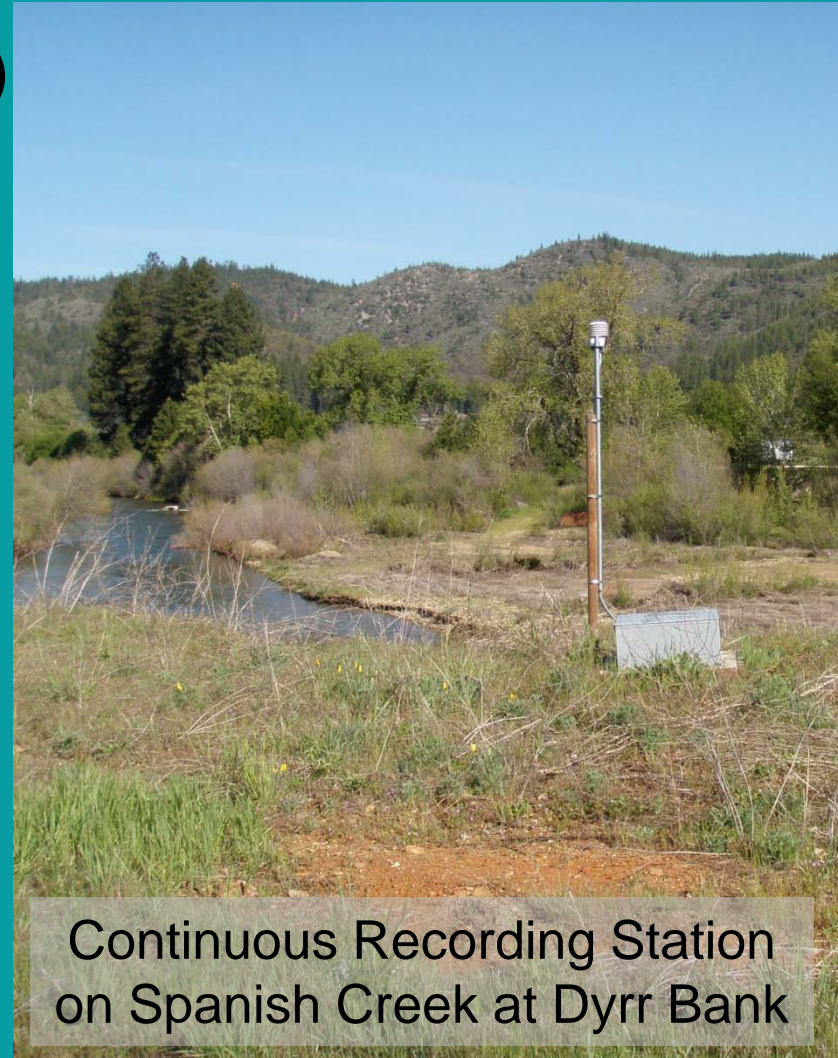
- 67 projects completed
- 47 miles of channel
- 4100 acres of meadow

- **Project distribution**

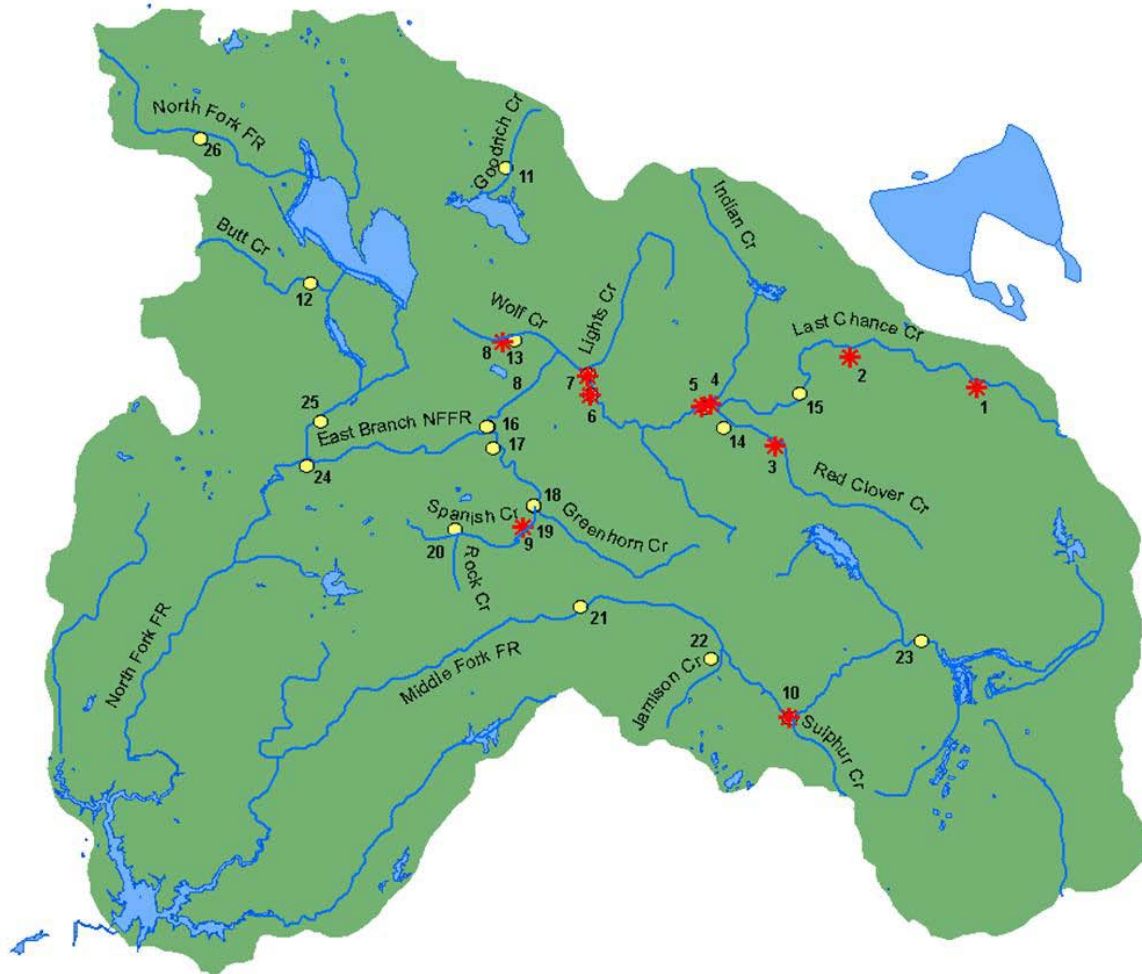
- One or more meadow projects have been implemented in 11 of the 15 groundwater basins in the Upper Feather River (DWR)

Monitoring & Modeling

- Watershed Level
 - Streamflow (continuous since 1999)
 - Water Temperature
 - Turbidity
 - Stream Condition Inventory
- Project Level
 - Groundwater Level
 - Water Temperature
 - Stream Condition Inventory
 - Soil Moisture
 - Stream Flow
 - Turbidity
 - Wildlife
 - Carbon
 - Vegetation



FRCRM Watershed Monitoring Sites

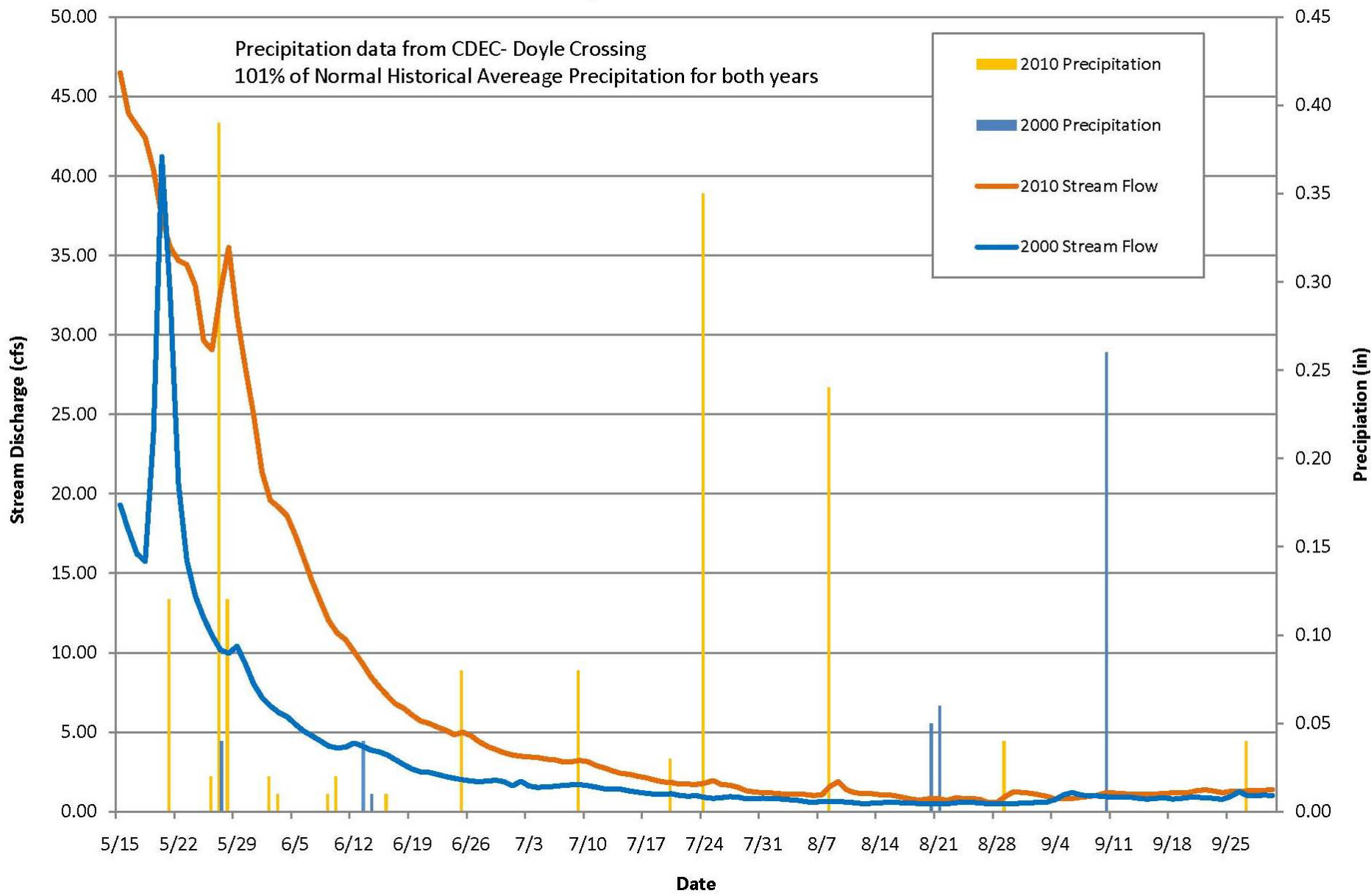


* Continuous Recording Stations • Monitoring Reaches

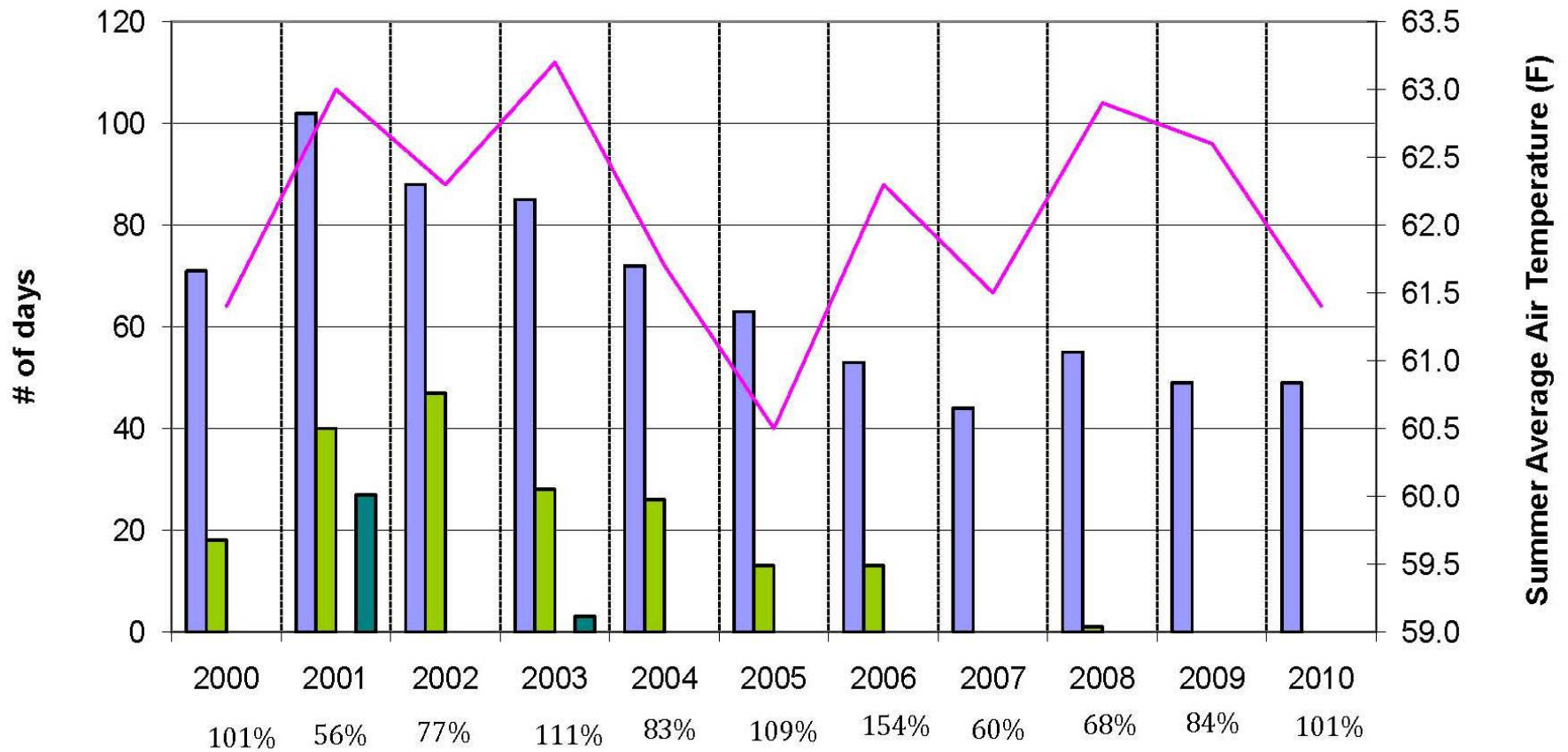
1. Last Chance Creek @ Million Dollar Bridge
2. Last Chance Creek @ Doyle Crossing
3. Red Clover Creek @ Notson Bridge
4. Indian Creek @ DWR Weir
5. Indian Creek @ Flournoy Bridge
6. Indian Creek @ Taylorsville Bridge
7. Lights Creek @ Deadfall Lane Bridge
8. Wolf Creek @ Ball Field Bridge
9. Spanish Creek @ Dyr Bank
10. Sulphur Creek @ Hwy 89 Bridge
11. Goodrich Creek
12. Butt Creek
13. Wolf Creek Abv Town Park
14. Red Clover Creek Blw Drum Bridge
15. Last Chance Creek Blw Murdock Crossing
16. Indian Creek Abv Spanish Creek
17. Spanish Creek Abv Indian Creek
18. Greenhorn Creek Mouth
19. Spanish Creek Abv Greenhorn Creek
20. Rock Creek Mouth
21. Middle Fork Feather River Abv Nelson Cr
22. Jamison Creek
23. Middle Fork Feather River @ Beckwourth
24. East Branch North Fork Feather River Abv North Fork Feather River
25. North Fork Feather River Abv East Branch North Fork Feather River
26. North Fork Feather River Abv Lake Almanor

Last Chance Creek at Doyle Crossing

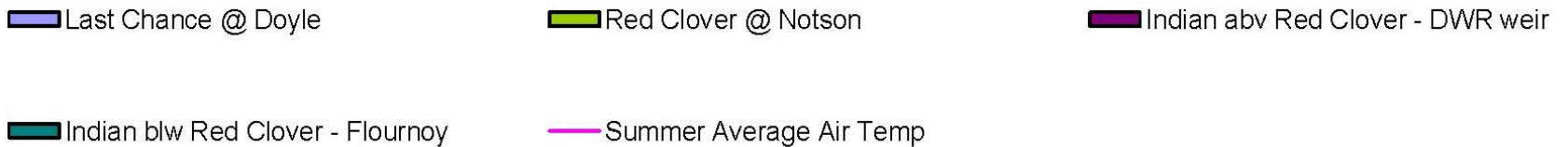
Stream Flow Comparison 2000 WY and 2010 WY



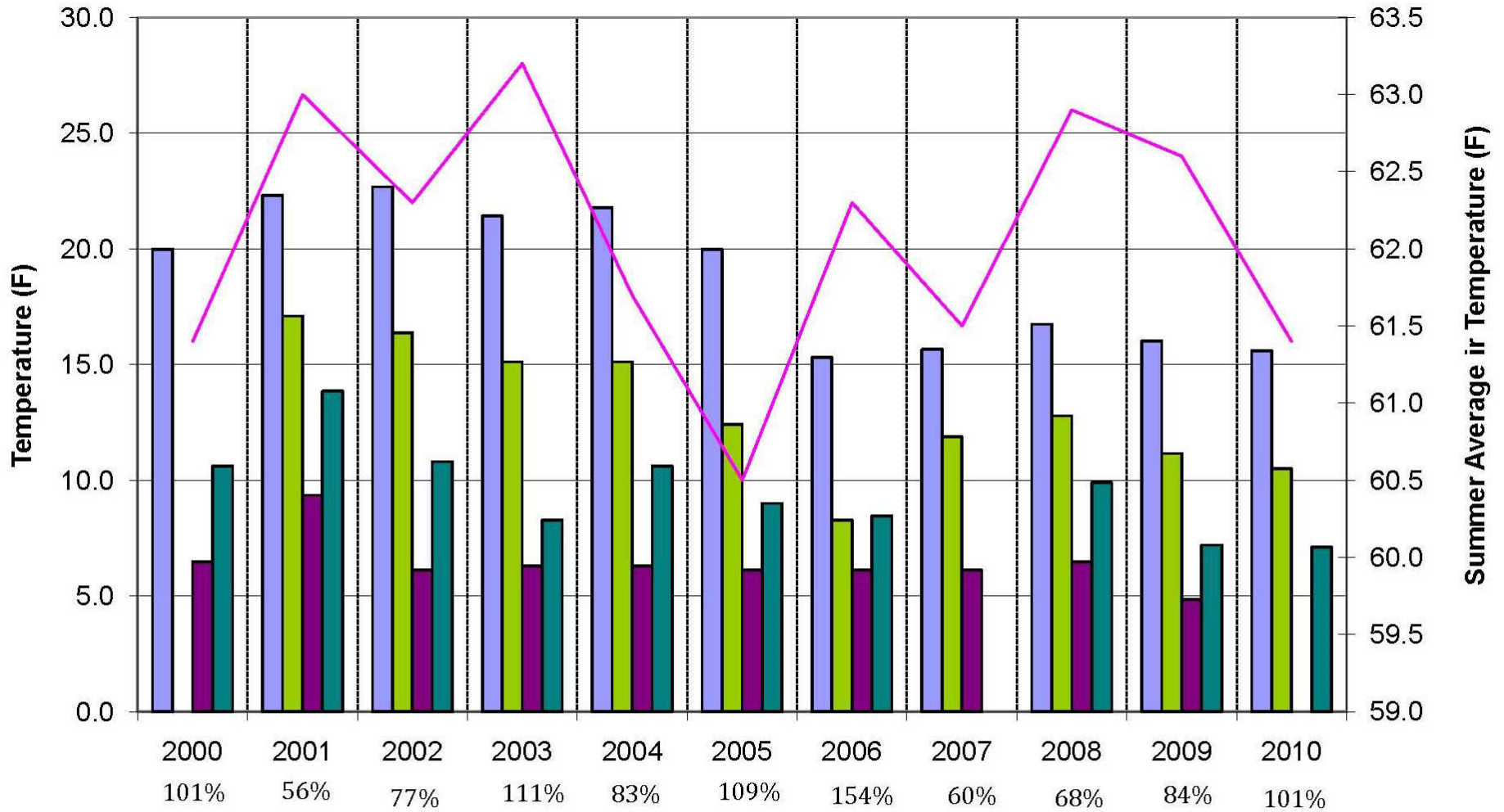
No. of Days w/Max Water Temperatures abv 75F



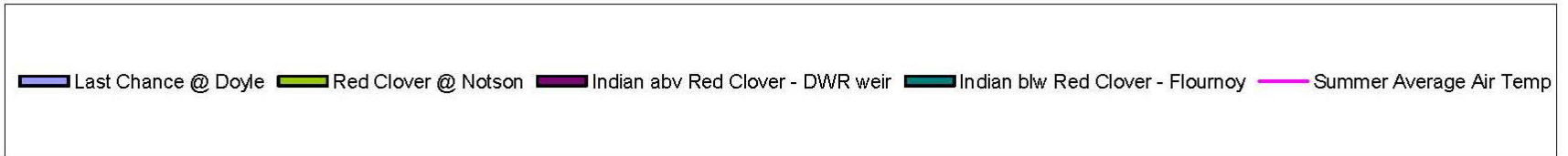
Year and Percent Historic Average Annual Precipitation for Feather River Basin



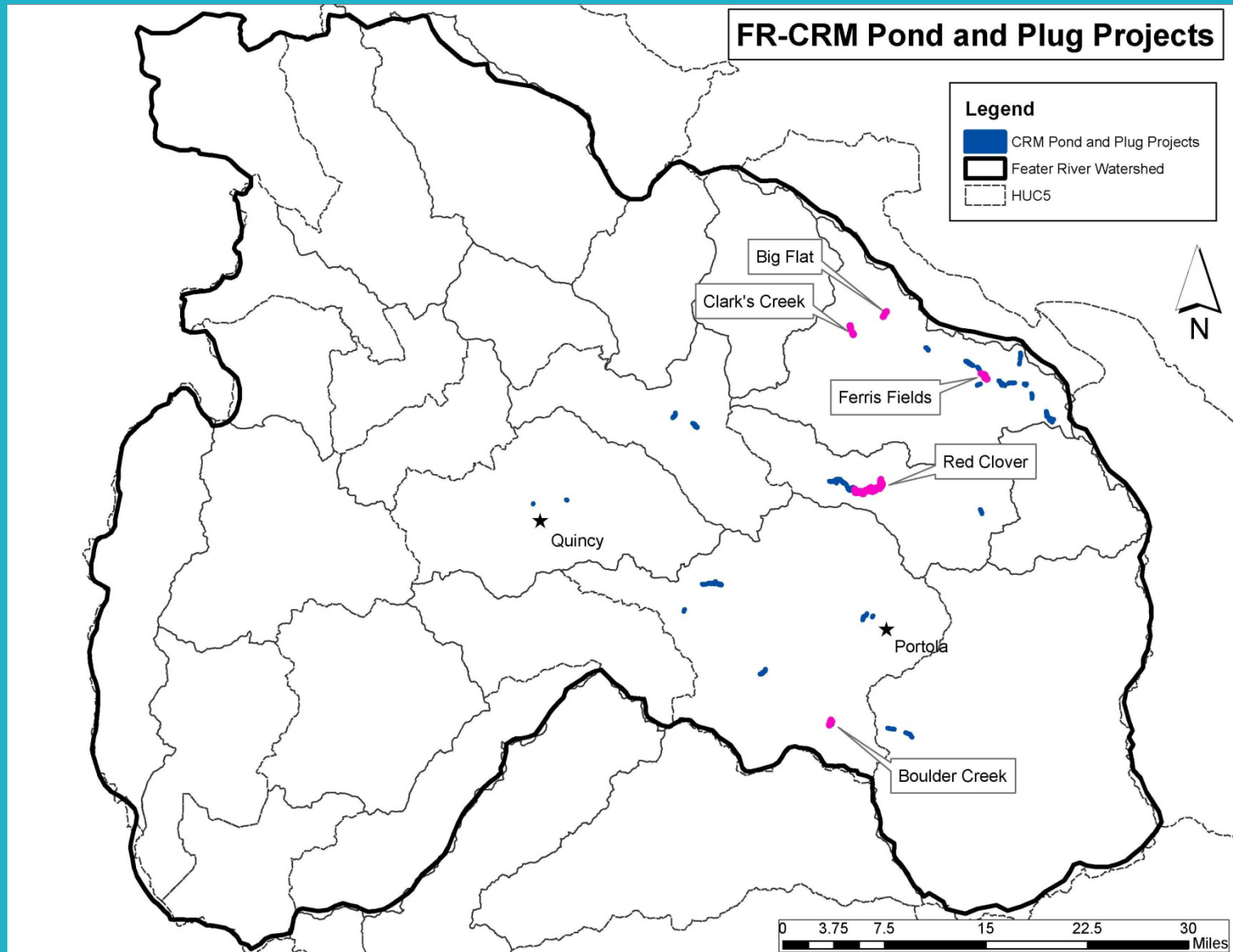
Average Summer Diurnal Fluctuation of Water Temperature



Year and Percent Historic Average Annual Precipitation for Feather River Basin



Project Monitoring



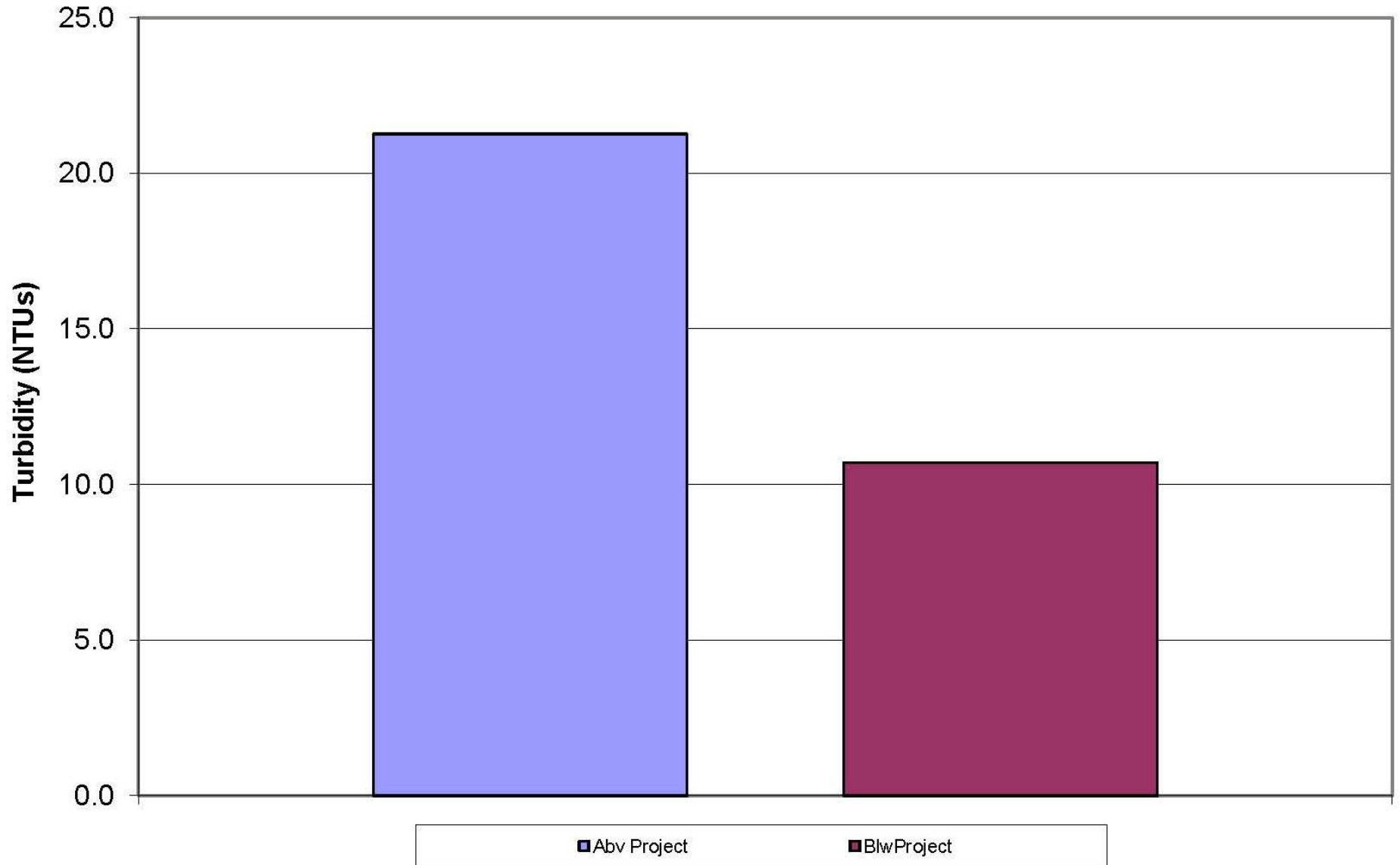
**Red Clover Creek project inflow, 5/5/2009;
Turbidity - 35 NTU**



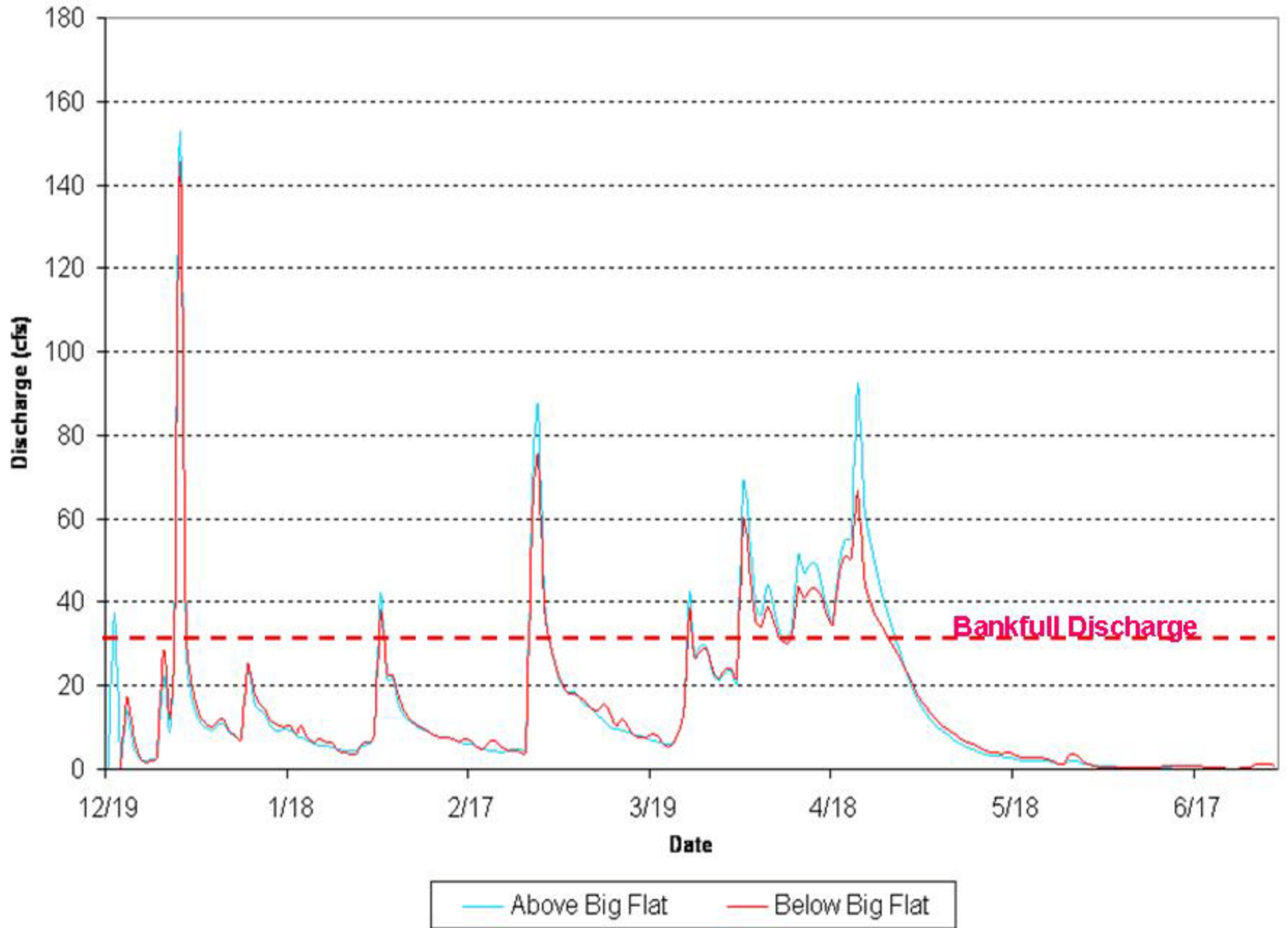
**Red Clover Creek project outflow, 5/5/2009;
Turbidity - 3 NTU**



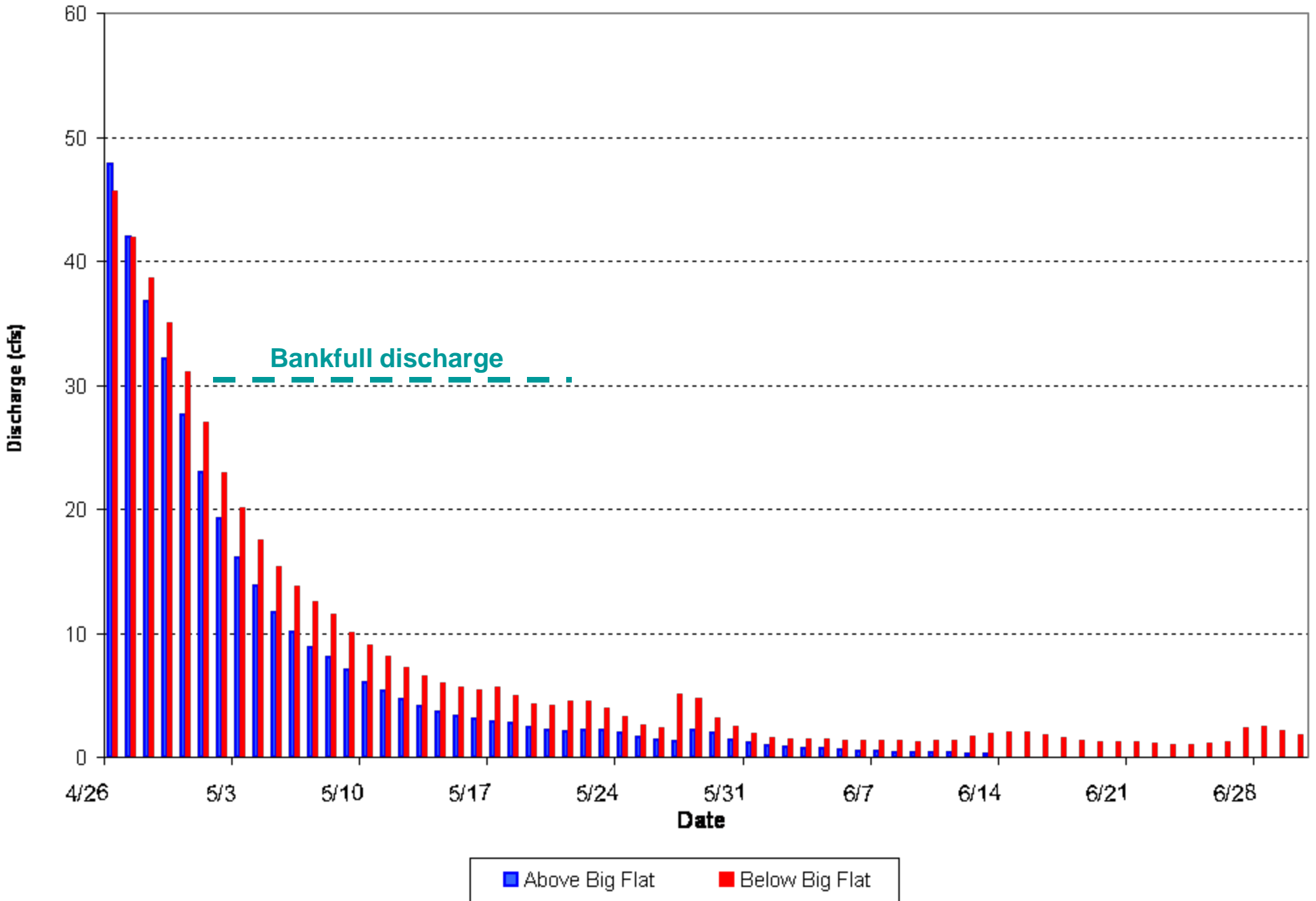
Red Clover McReynolds Creeks Project Average Turbidity 2007- 2010 Runoff Seasons



Big Flat Discharge, WY 2006 Annual Hydrograph



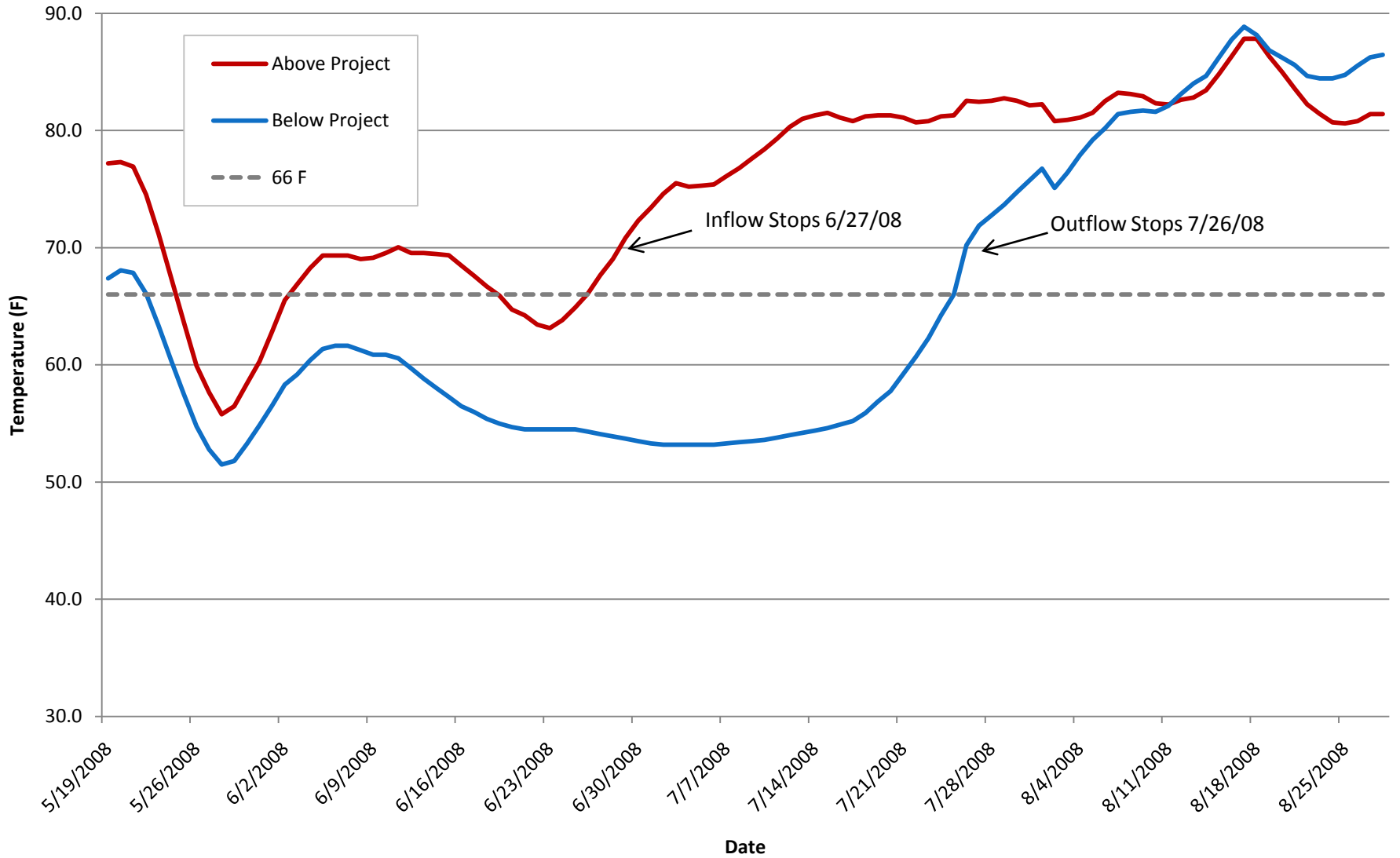
Big Flat Discharge, WY 2006 Spring Recession



Clarks Creek Restoration Project

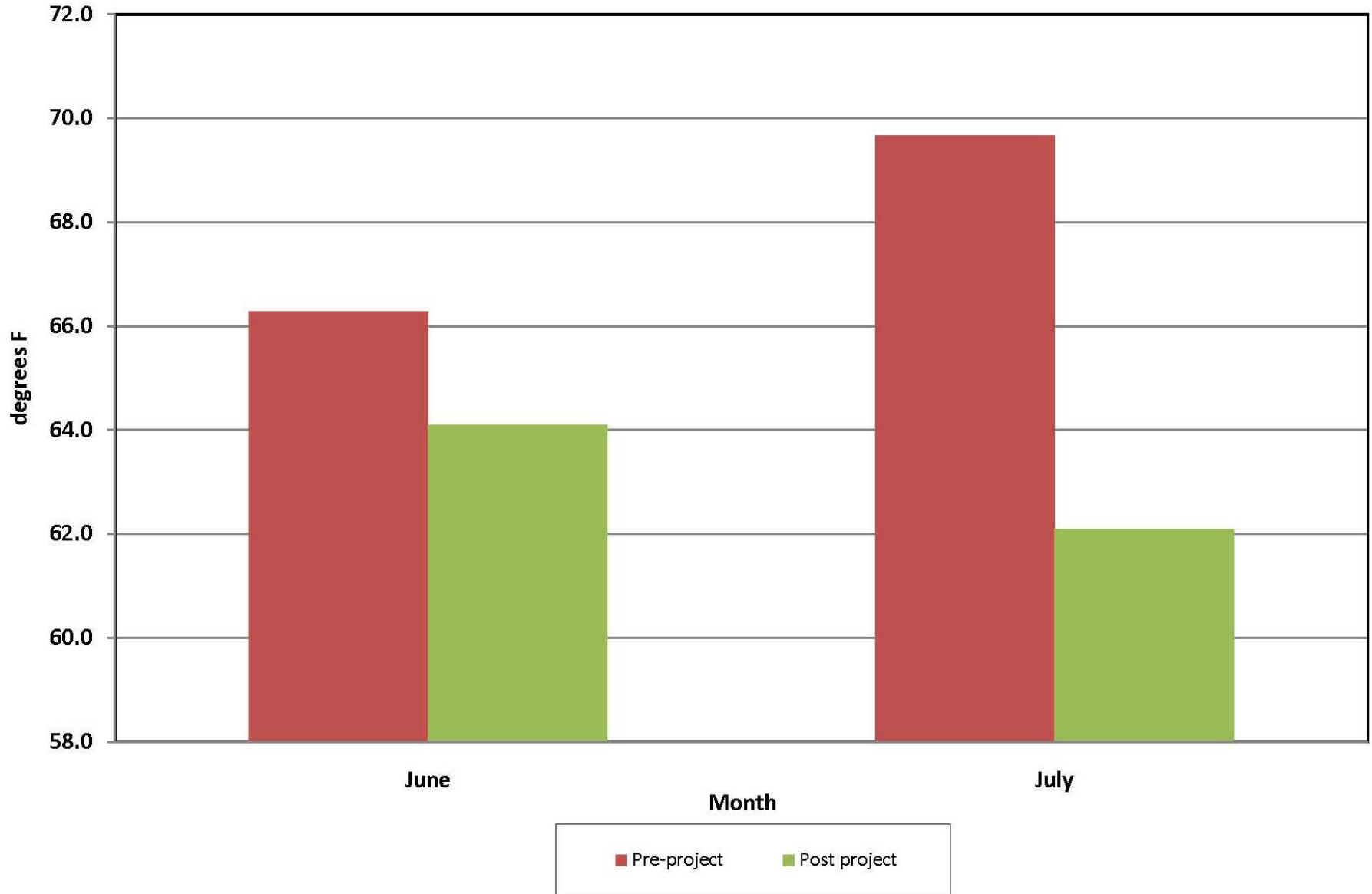
Maximum Weekly Average Water Temperature

2008



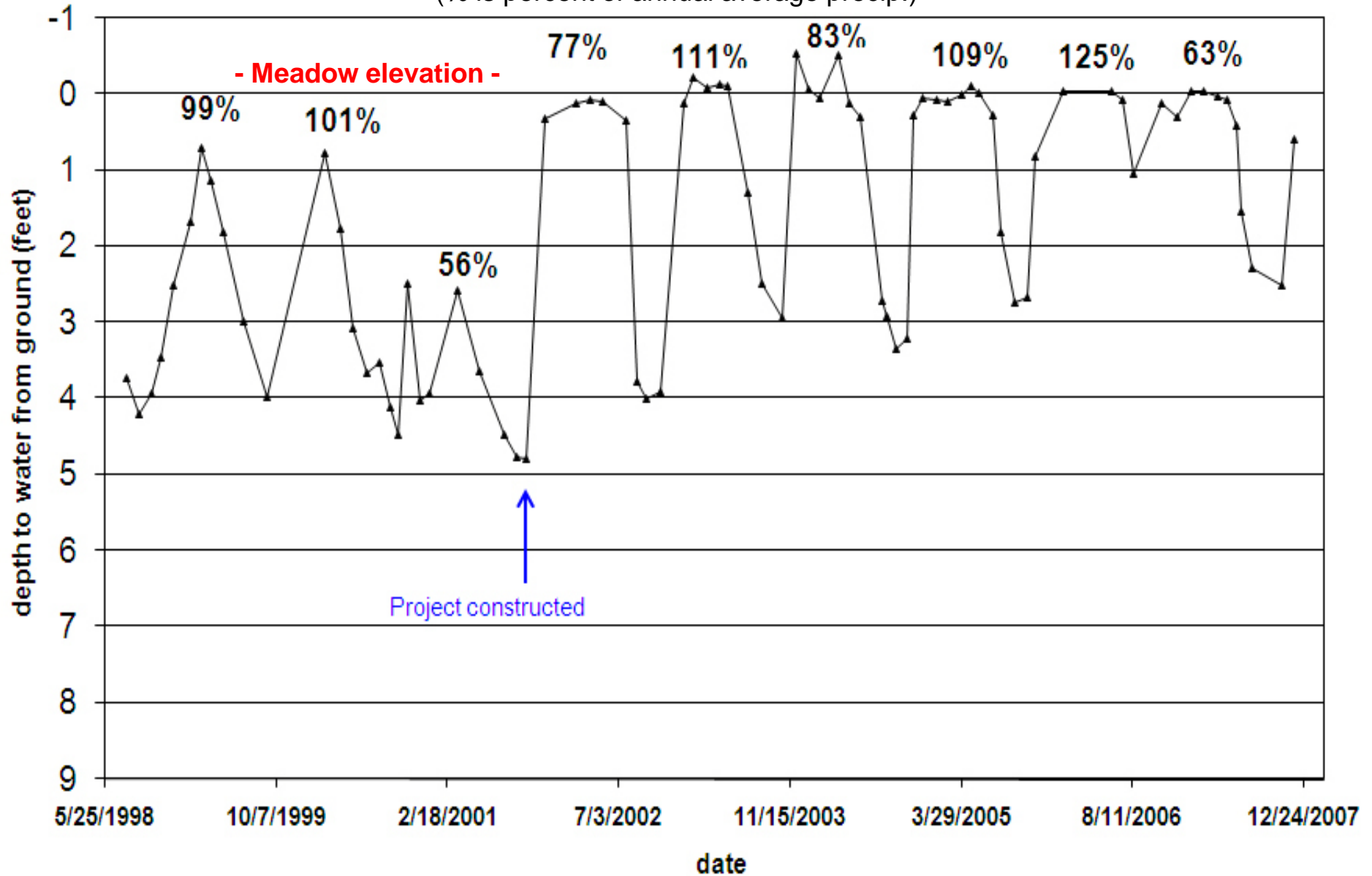
**Last Chance Creek- Ferris Fields
Pre-project (2007) and post-project (2008)**

Average Water Temperatures (below the project)

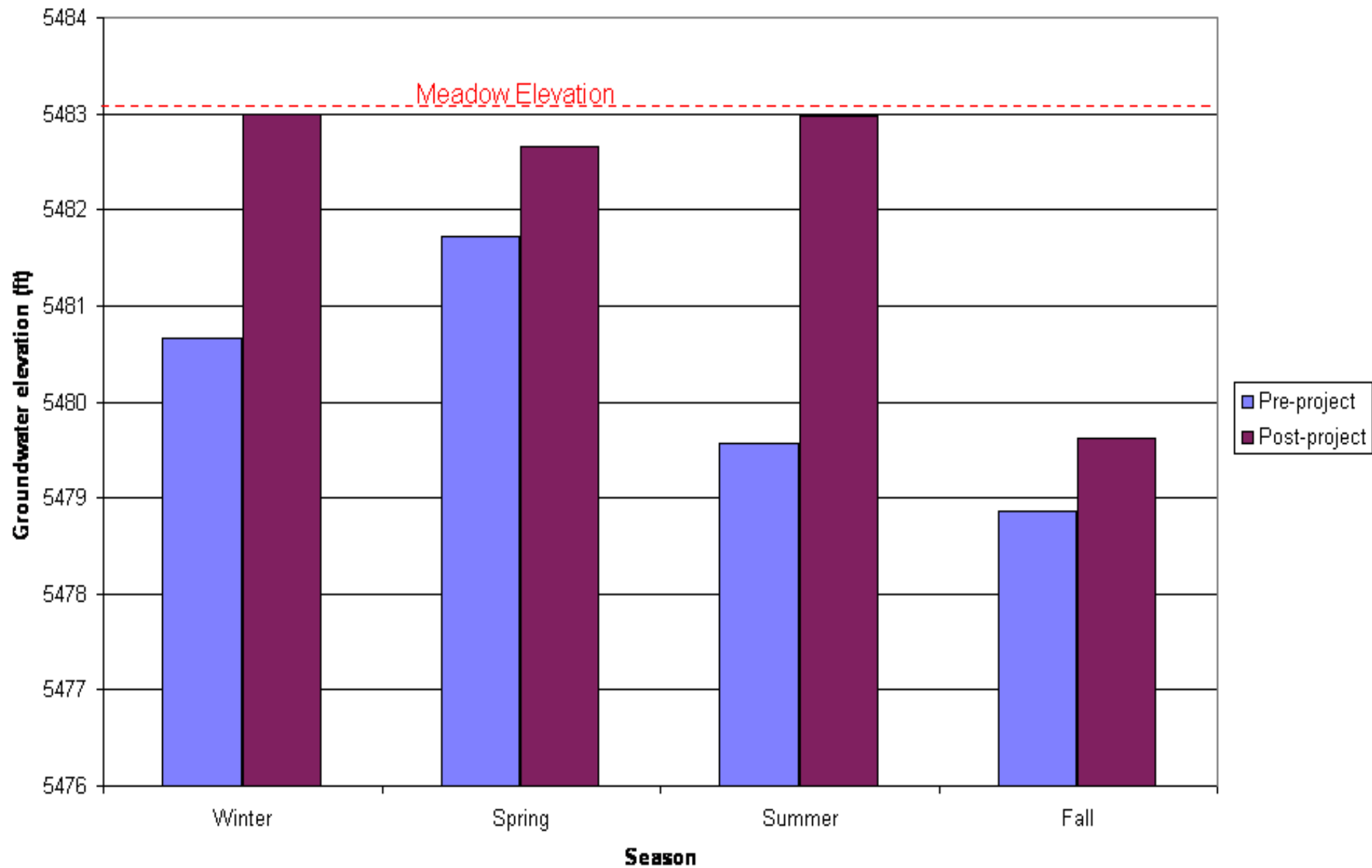


Clarks Cr Groundwater Level Well #UC2

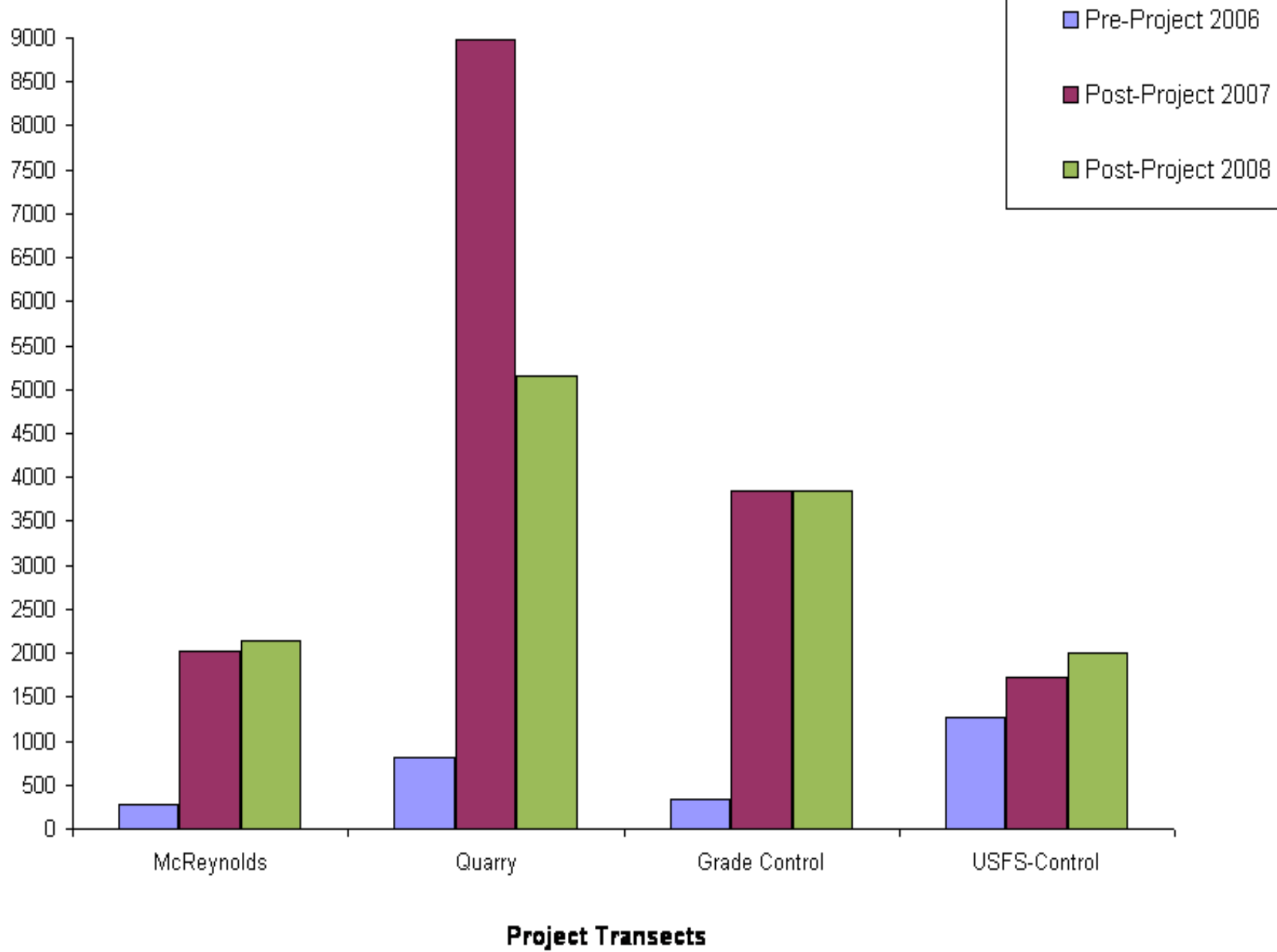
(% is percent of annual average precip.)



Clarks Creek Restoration Project, 8/2001
Seasonal Groundwater Change
(ave. 1998-2006)

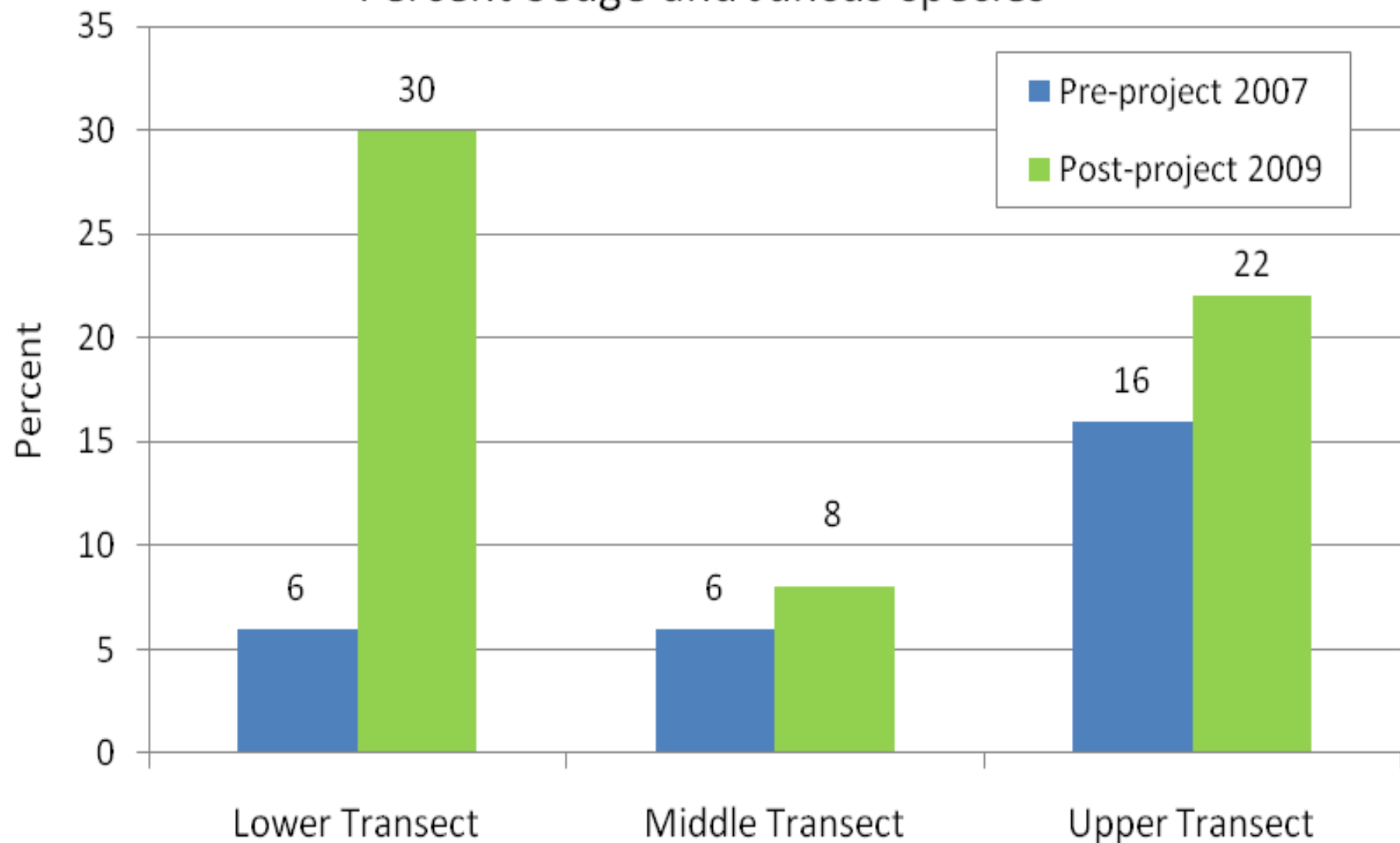


Red Clover Total Forage Production

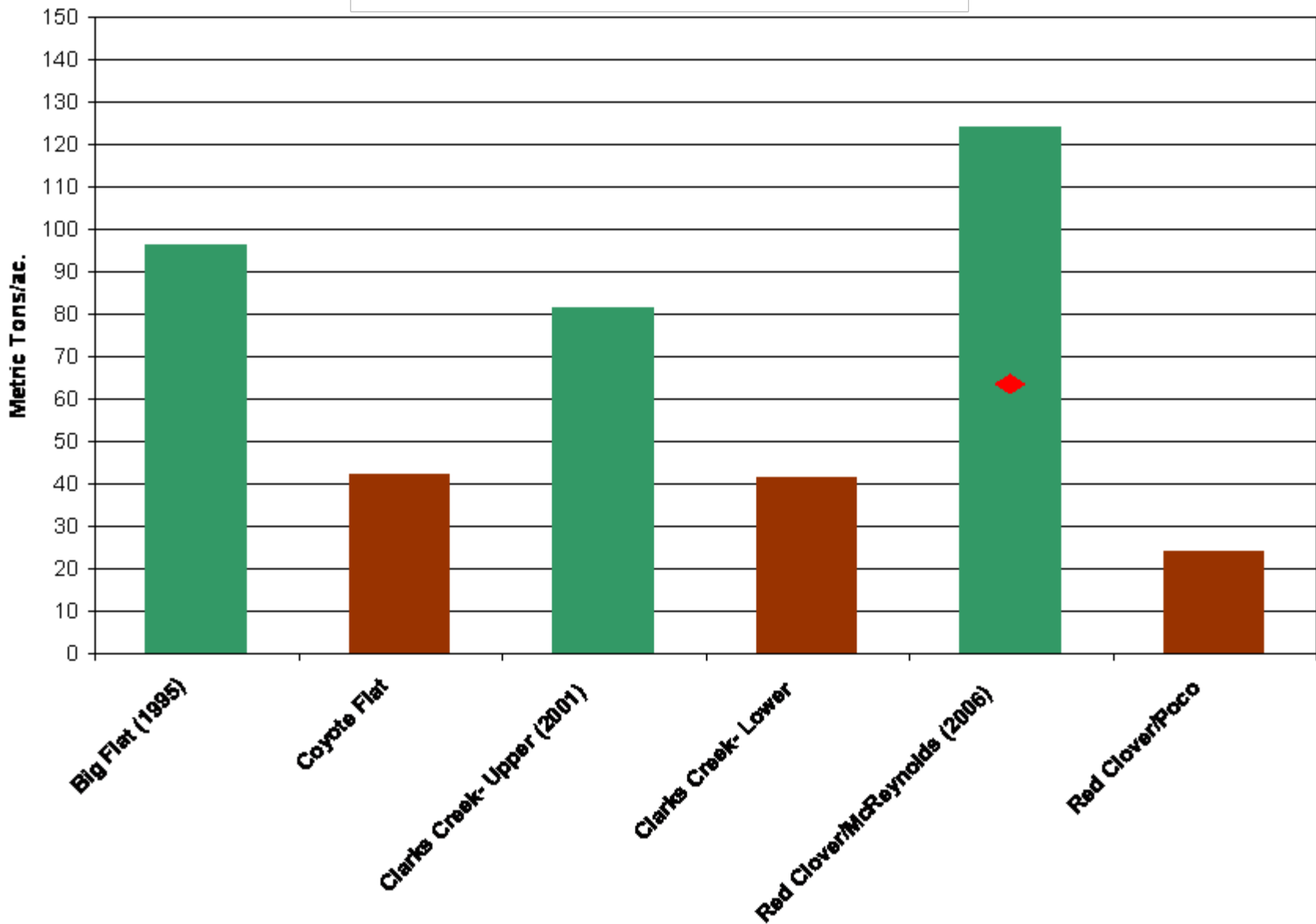


Boulder Creek Vegetative Transects

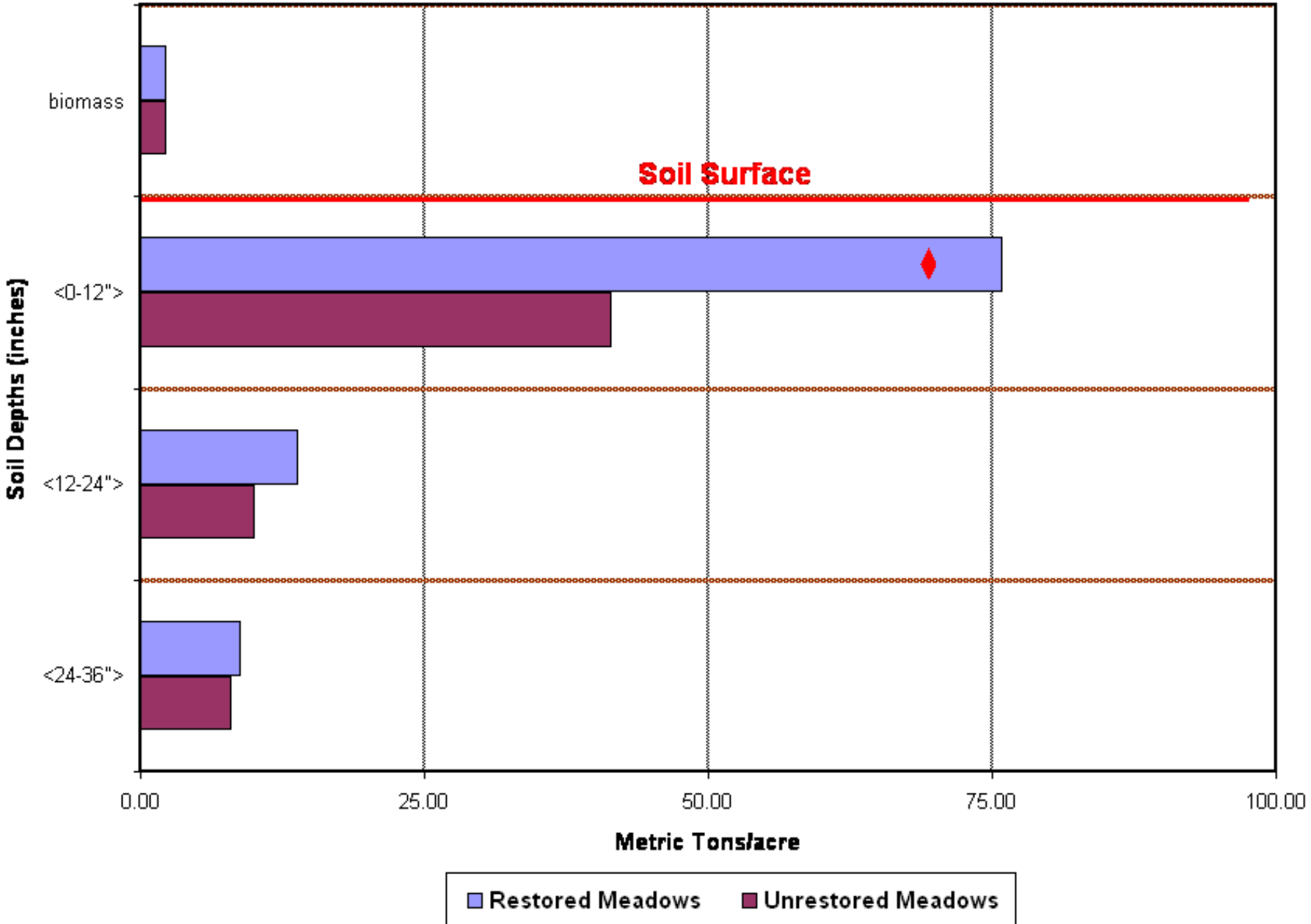
Percent Sedge and Juncus species



Carbon Stocks (restored vs unrestored meadows)



Meadow Carbon Change - Distribution by Soil Depth



Cottonwood Creek, Big Flat



<u>Sample Date</u>	<u>Name/Length of Stream Sampled</u>	<u>Species</u>	<u>Total Catch</u>	<u>Population Estimate/mile</u>	<u>Biomass/mile</u>
5/23/2000	Big Flat-100 feet	Rainbow Trout	60	1,126	45,700 m/L
5/24/2000	Clarks Creek-100 feet	Rainbow Trout	14	352	9,700 m/L





Red Clover- McReynolds Creek Project Avifauna Monitoring (2004- 2008)

Bird Species Diversity-

64 species in 2004/122 species in 2008

Species richness-

Increased from 26.7 species to 30.3 species

Wetland/Riparian obligates-

30 species only occurring post-project

Special status species-

12 species only occurring post-project

Neotropical migrant songbirds-

34% of total avifauna species

Wilson's phalarope (*Phalaropus tricolor*)



Waterfowl Population Results

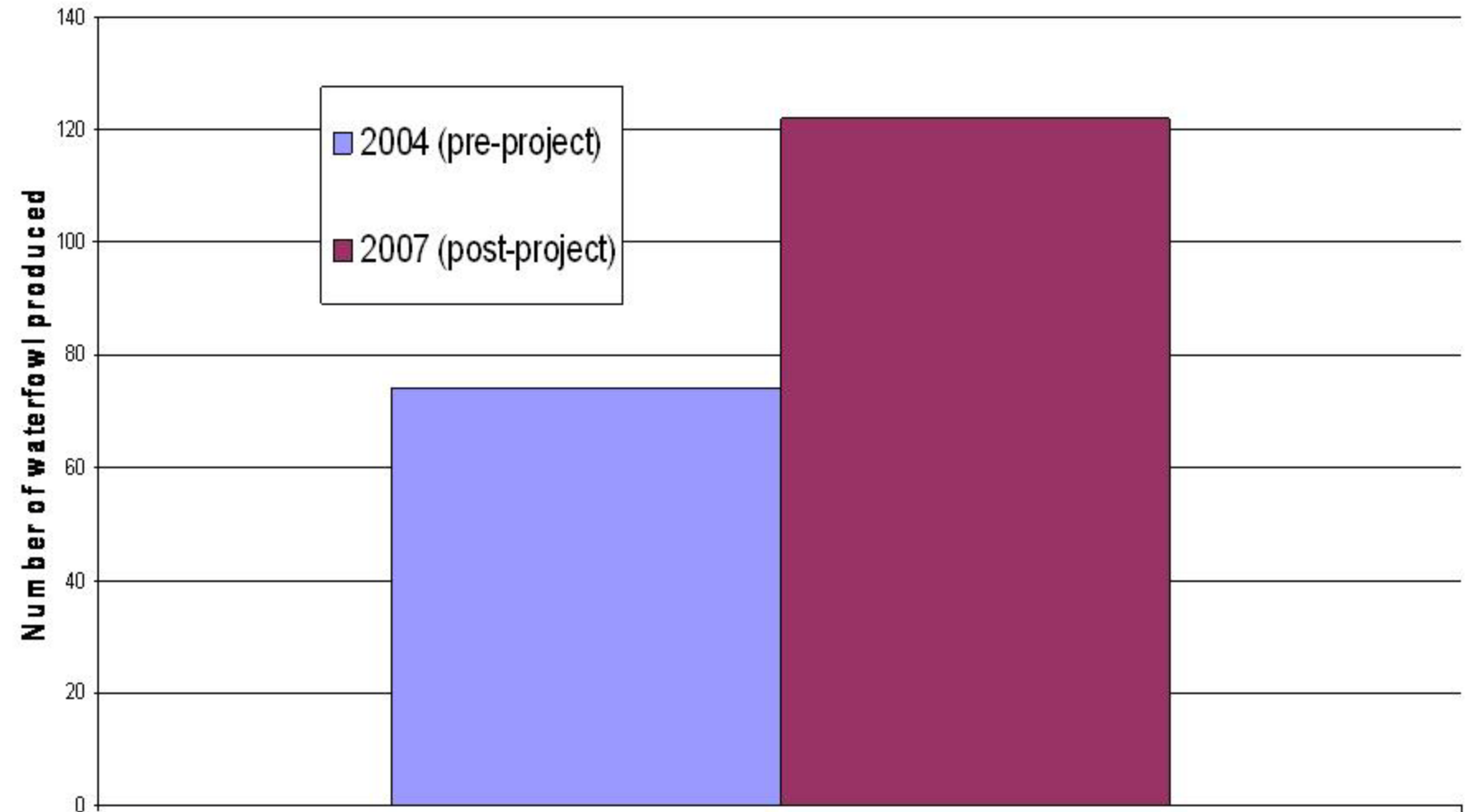
9 waterfowl species observed using the study area pre-project.

- Of these nine only three were observed breeding:
 - Mallard (*Anas platyrhynchos*), green-winged teal (*Anas crecca*), and common merganser (*Mergus merganser*)

18 waterfowl species observed post-project

- Of these, eight were observed breeding:
 - Bufflehead (*Bucephala albeola*), gadwall (*Anas strepera*), green-winged teal (*Anas crecca*), blue-winged teal (*Anas discors*), mallard (*Anas platyrhynchos*), Canada goose (*Branta canadensis*), common merganser (*Mergus merganser*), pied-billed grebe (*Podilymbus podiceps*)

Red Clover/McReynolds Creek Project Annual waterfowl production



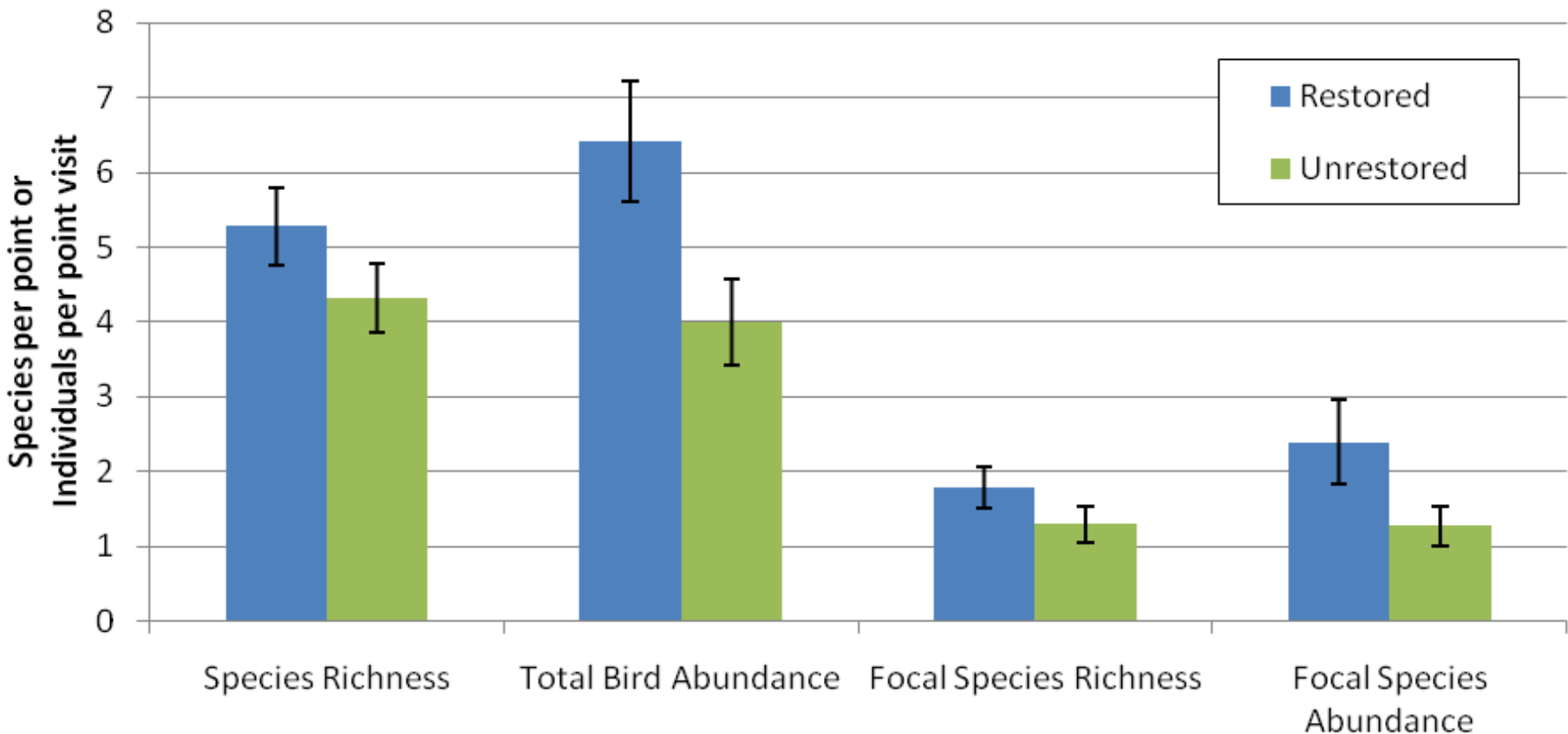
Pre-project (2004) – 74 young produced

Post-project (2007) – 122 young produced

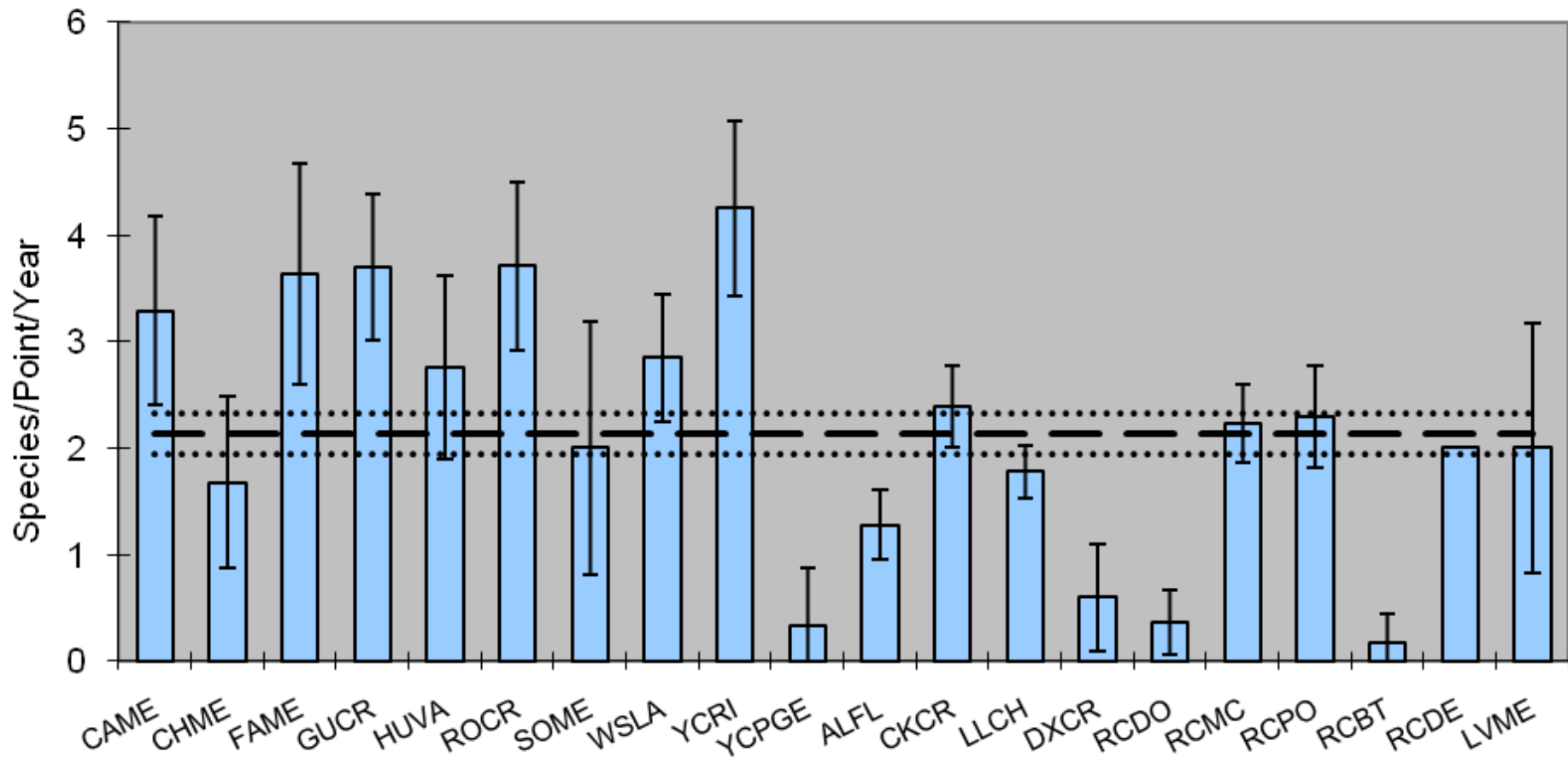


Partner Point Count Monitoring

CRM Restored vs. Unrestored



Focal Species Richness



Monitoring Conclusions

- Working towards more rigorous statistical analysis of our watershed wide stream flow and water temperature data
- Monitoring is driven by funding

All monitoring data can be found on our website:

www.feather-river-crm.org