Effects of Removing Conifers to Restore Aspen in Riparian Areas

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and
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Ecological Importance

- Biodiversity: second only to riparian areas in the West
  - Abundance and diversity of plants, birds, inverts, and snails is greater in aspen stands than surrounding conifers
- Water yields: aspen transpire less compared to conifers
- Provide: higher forage quality as well important habitat structure for birds and mammals

Estimated Decline of Aspen
(Bartos 2001)

State	% Decline of Aspen
Arizona	96
New Mexico	88
Montana	64
Idaho	61
Wyoming	53
Utah	51
Colorado	49

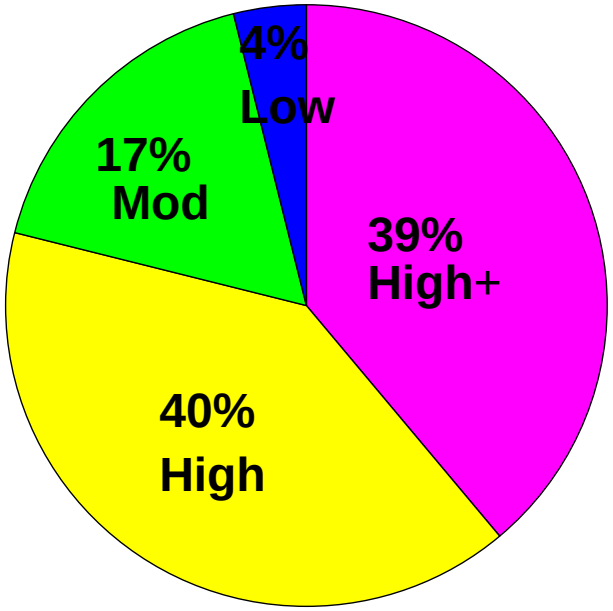
Aspen overtopped by conifers

Inventory Data

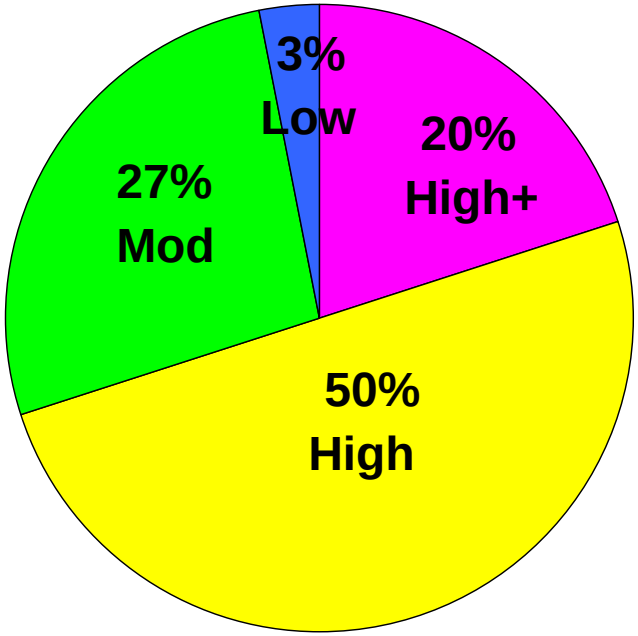
Risk Rating Summary, Live Stands Only

(2000-2006, N=666 stands; 3,691 acres)

Number



Hectares



•Demonstrate the need for restoration

Baseline Monitoring
Using Inventory Data

	Conifer Removal	Control Browsing
Num. of Stands	641 (96%)	357 (54%)
Acres	3,624 (98%)	1512 (41%)

Make management recommendations for individual stands

1999

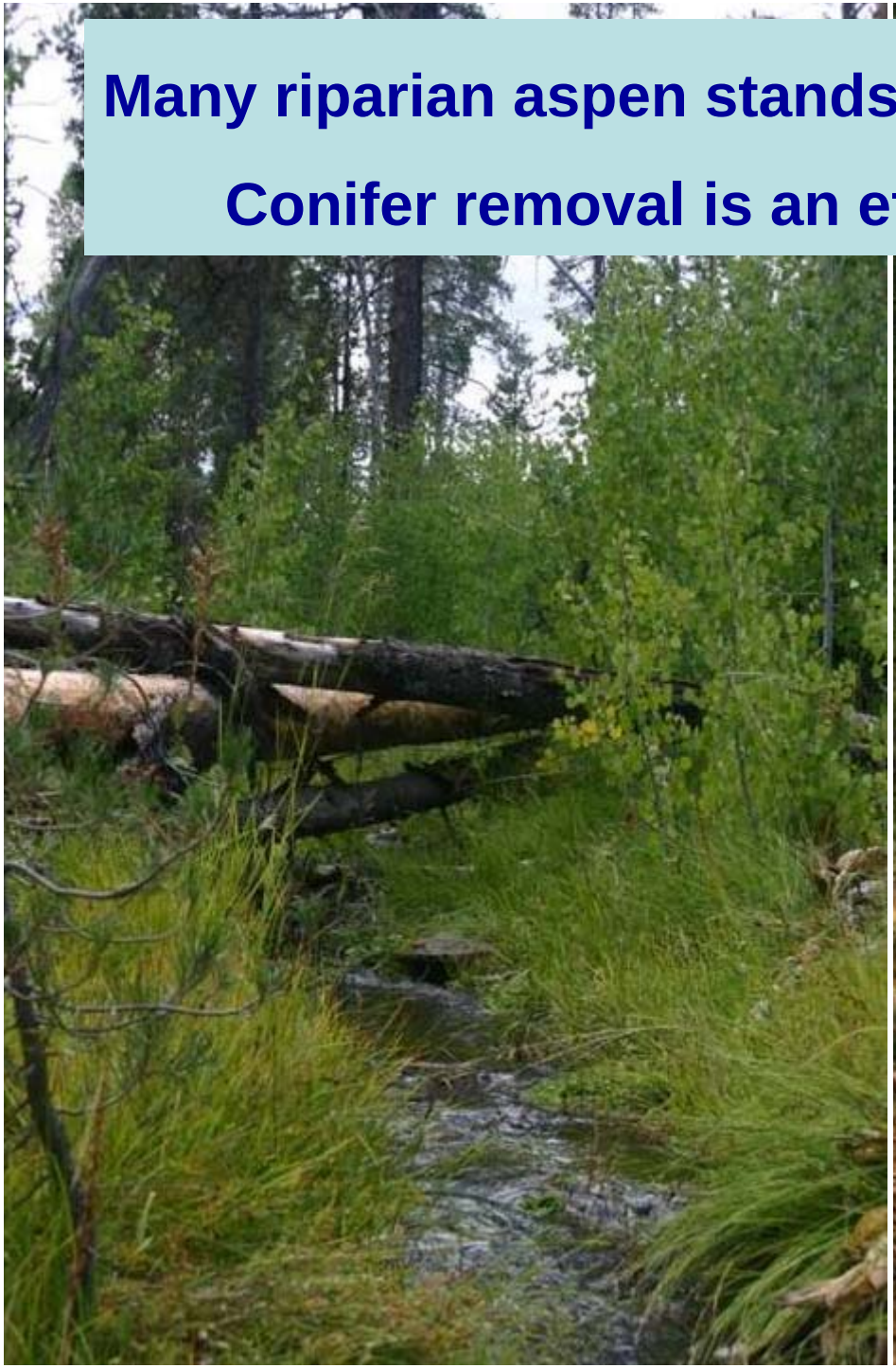
2000

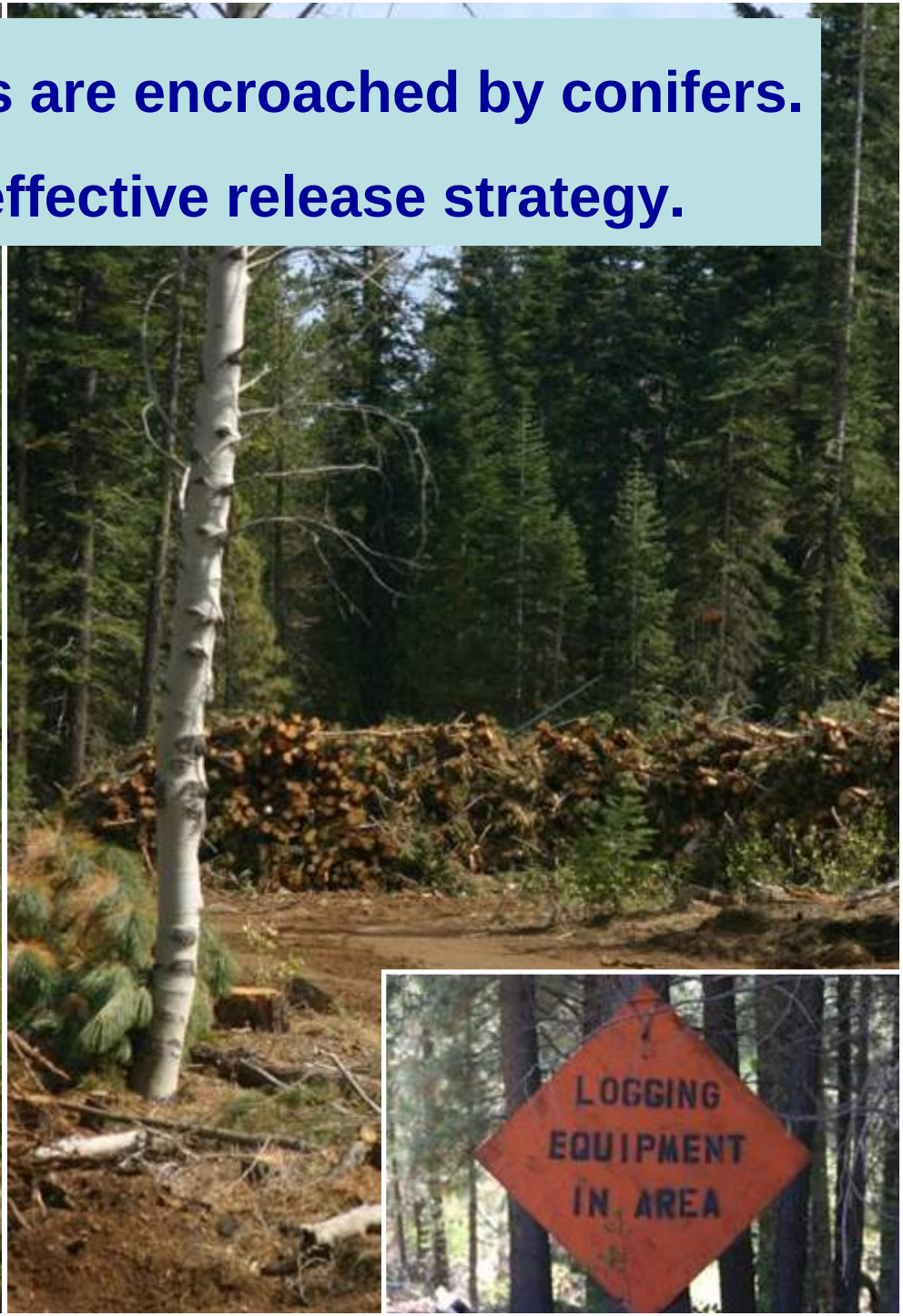
2001

2004

Many riparian aspen stands are encroached by conifers.

Conifer removal is an effective release strategy.





Some Concerns

- Reduce stream canopy cover?
- Increase stream temperature?
- Degrade water quality and aquatic habitat?
- Compact soils?

A joint monitoring project

USDA-FS LNF

USDA-FS FHRP Region 5

Aspen Delineation Project

UC Davis

Summer 2003 – enrolled 4 streams in a monitoring program…

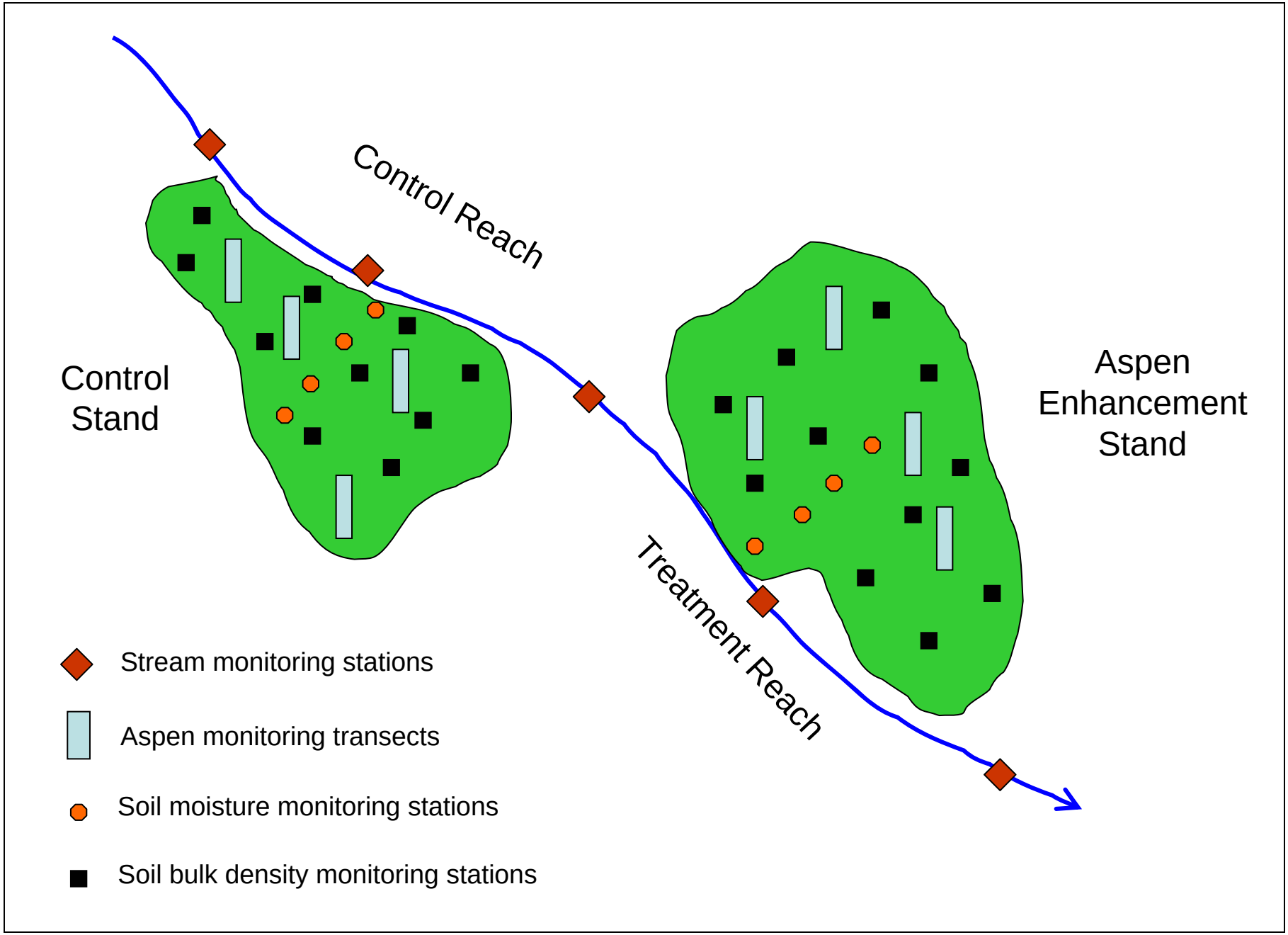
Pine and Bogard Creeks – ELRD
- Jan 2004
- Aug 2005
- Jan/Feb 2008

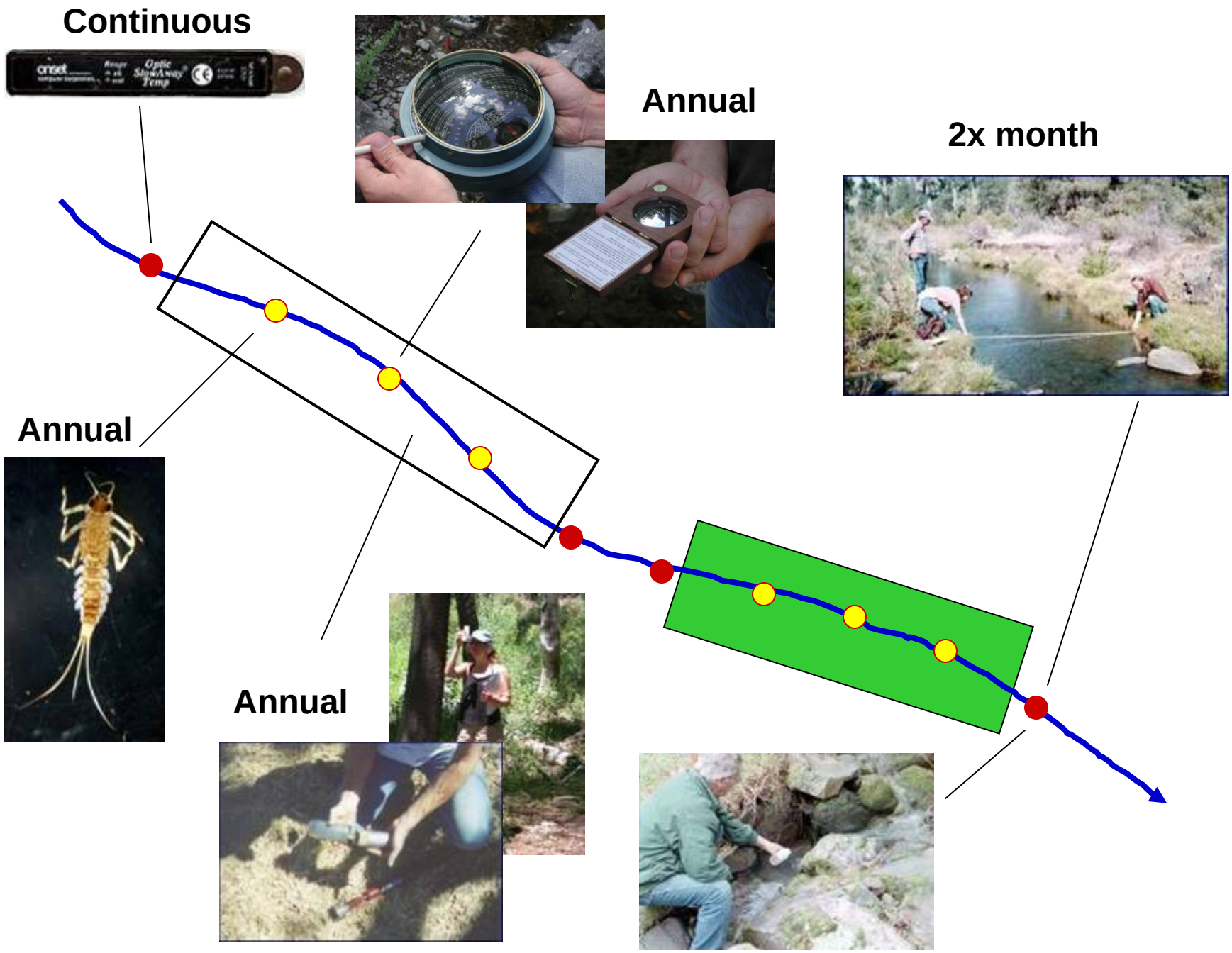
Butte Creek – HCRD
- pending

Bailey Creek – HCRD
- Sep 2006

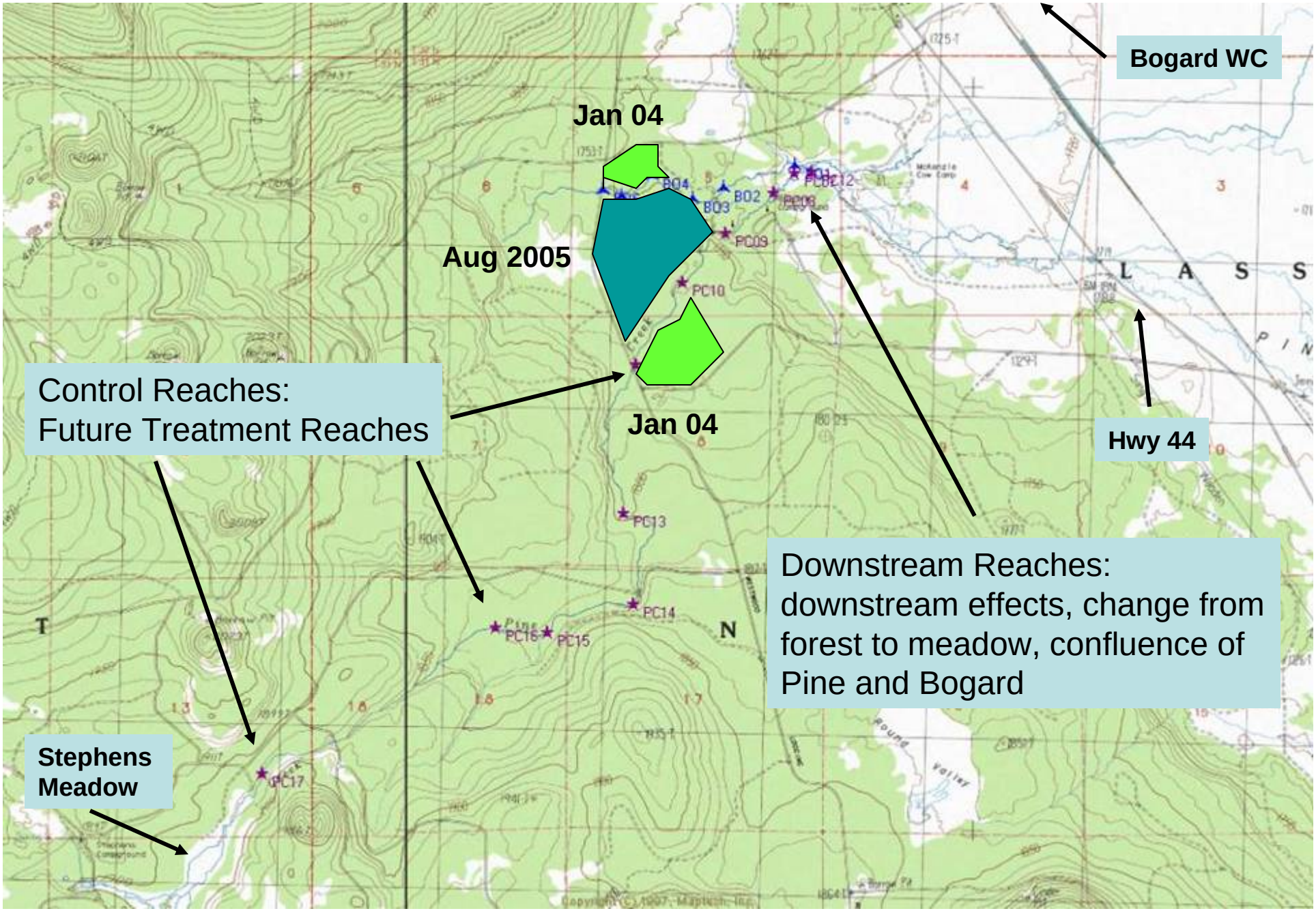
Focus today on Pine and Bogard Creeks

Mitigations and Harvest Methods Applied


Control Reach
Control Stand
Treatment Reach
Aspen Enhancement Stand
Stream monitoring stations
Aspen monitoring transects
Soil moisture monitoring stations
Soil bulk density monitoring stations

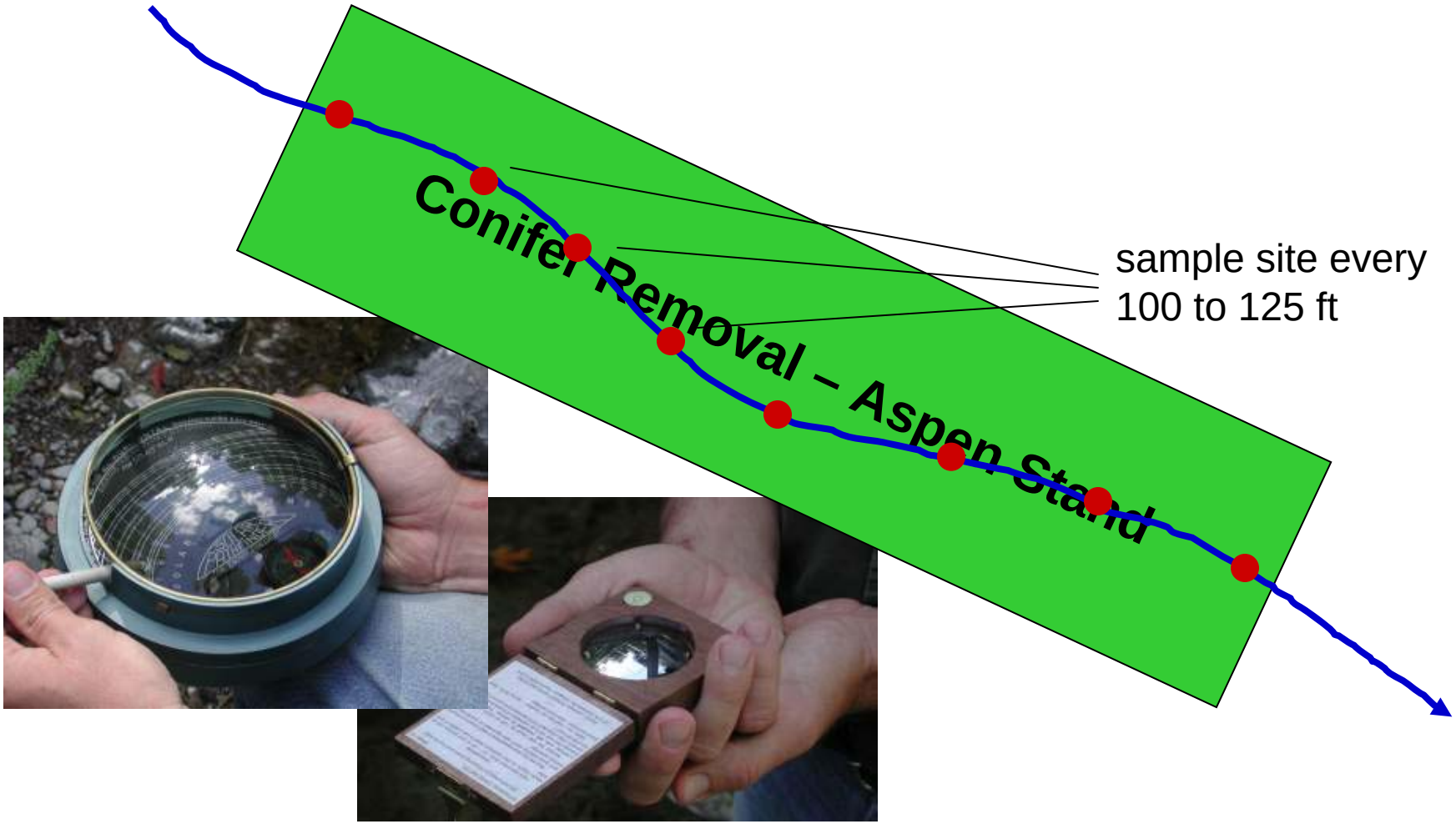

Continuous
Annual
2x month
Annual
Annual

Pine – Bogard Creek Monitoring Sites



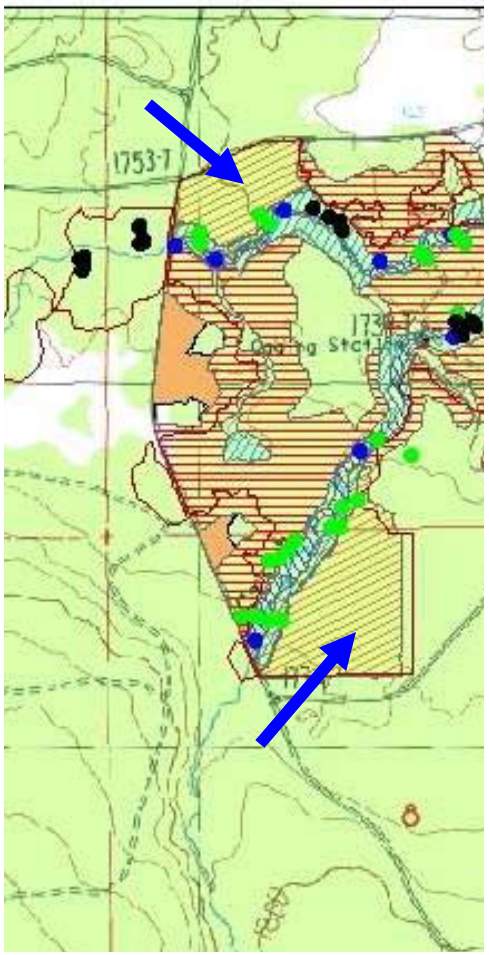
Canopy Cover and Solar Input

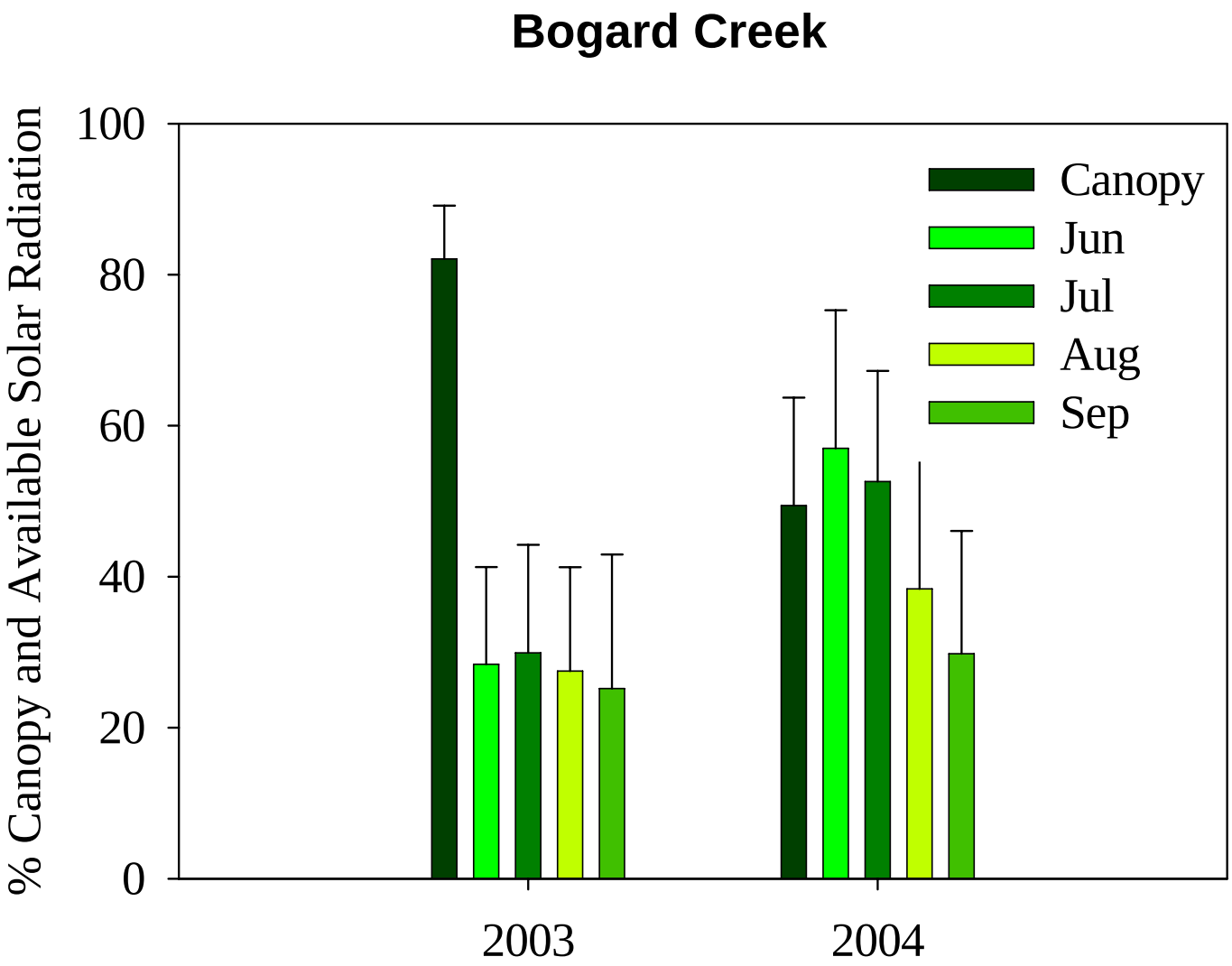
Test for change before and after conifer removal



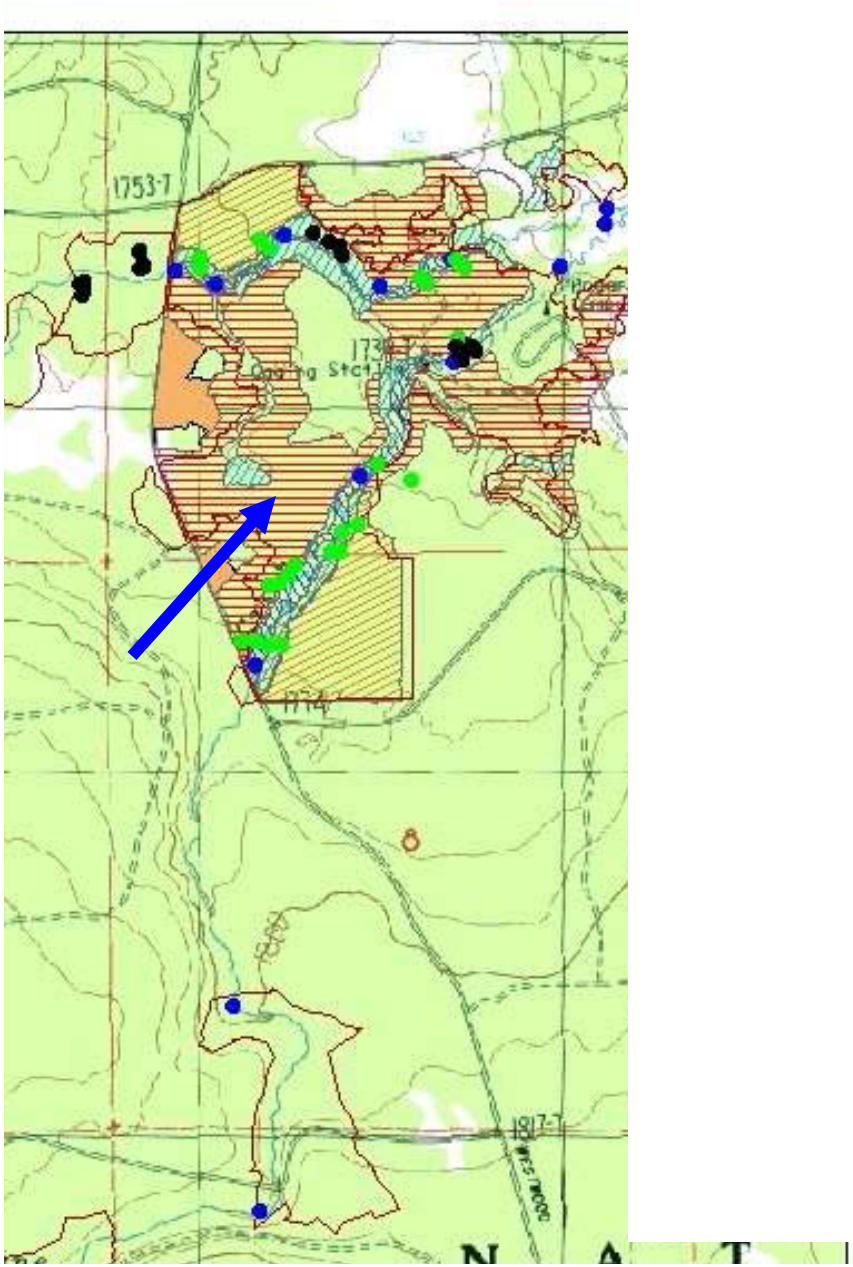
Jan 2004 Enhancement Project

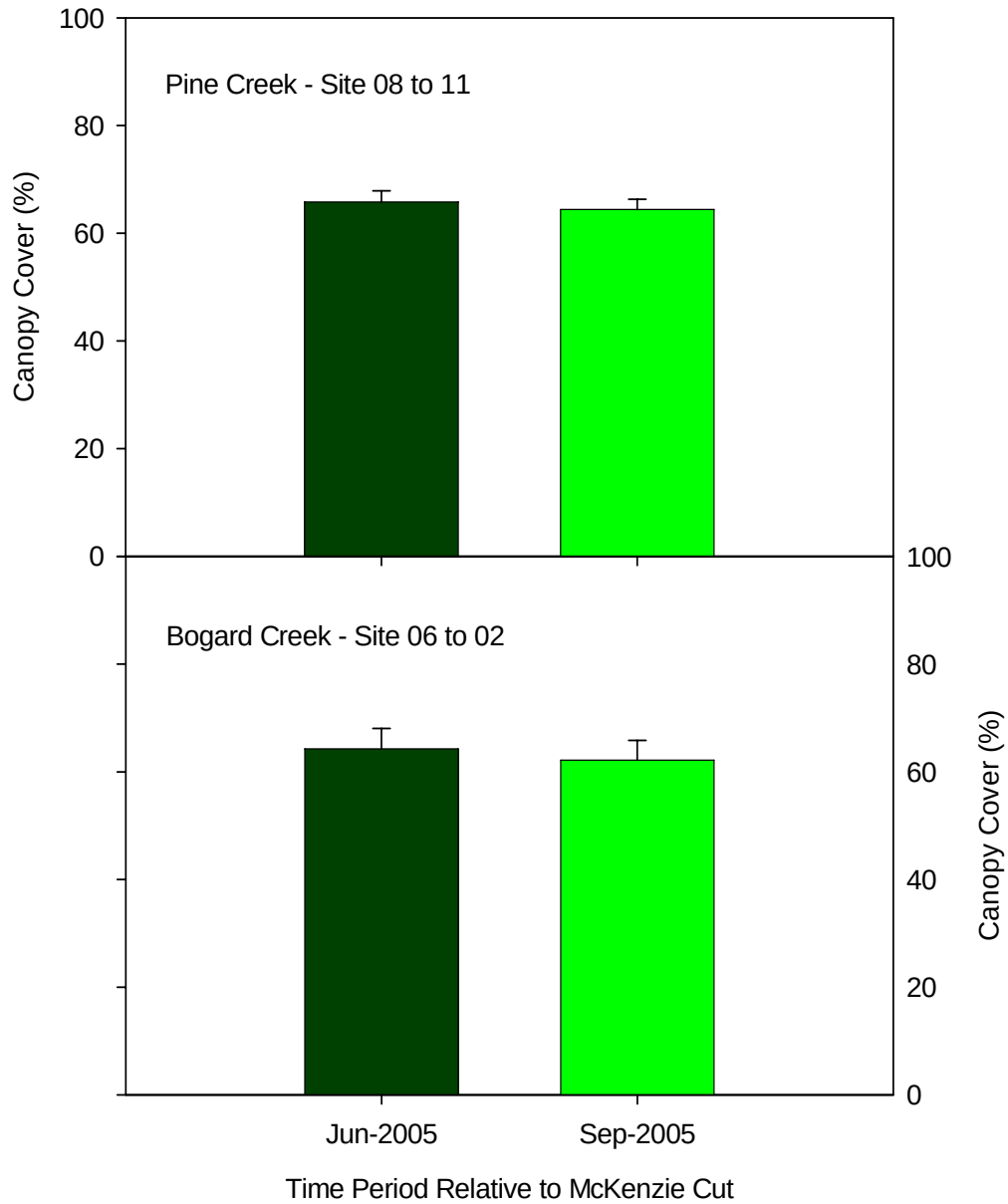
Significantly reduced due to conifer removal (P<0.05).
Bogard -32% Pine -10% (SCI)





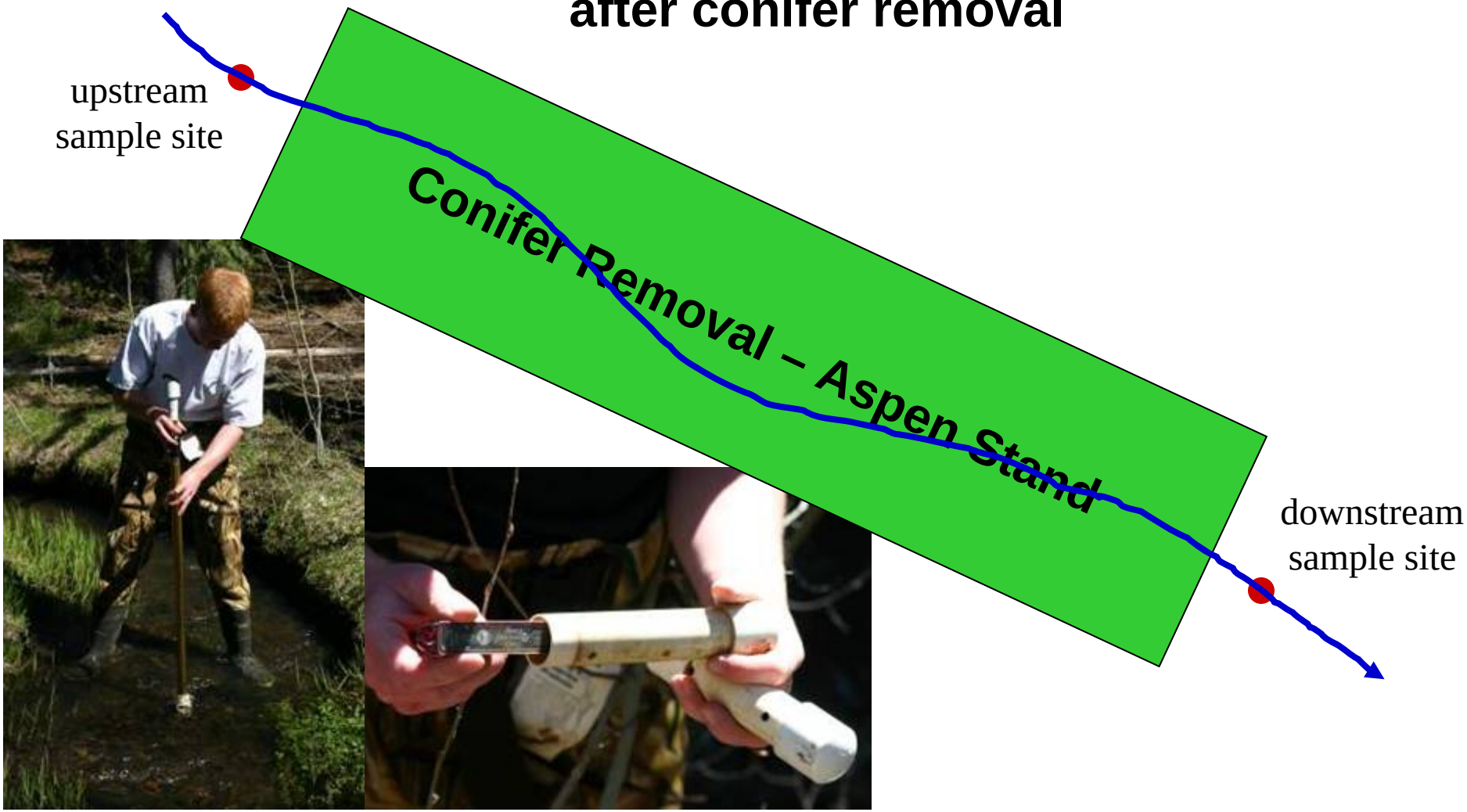
Aug 2005 Enhancement Project



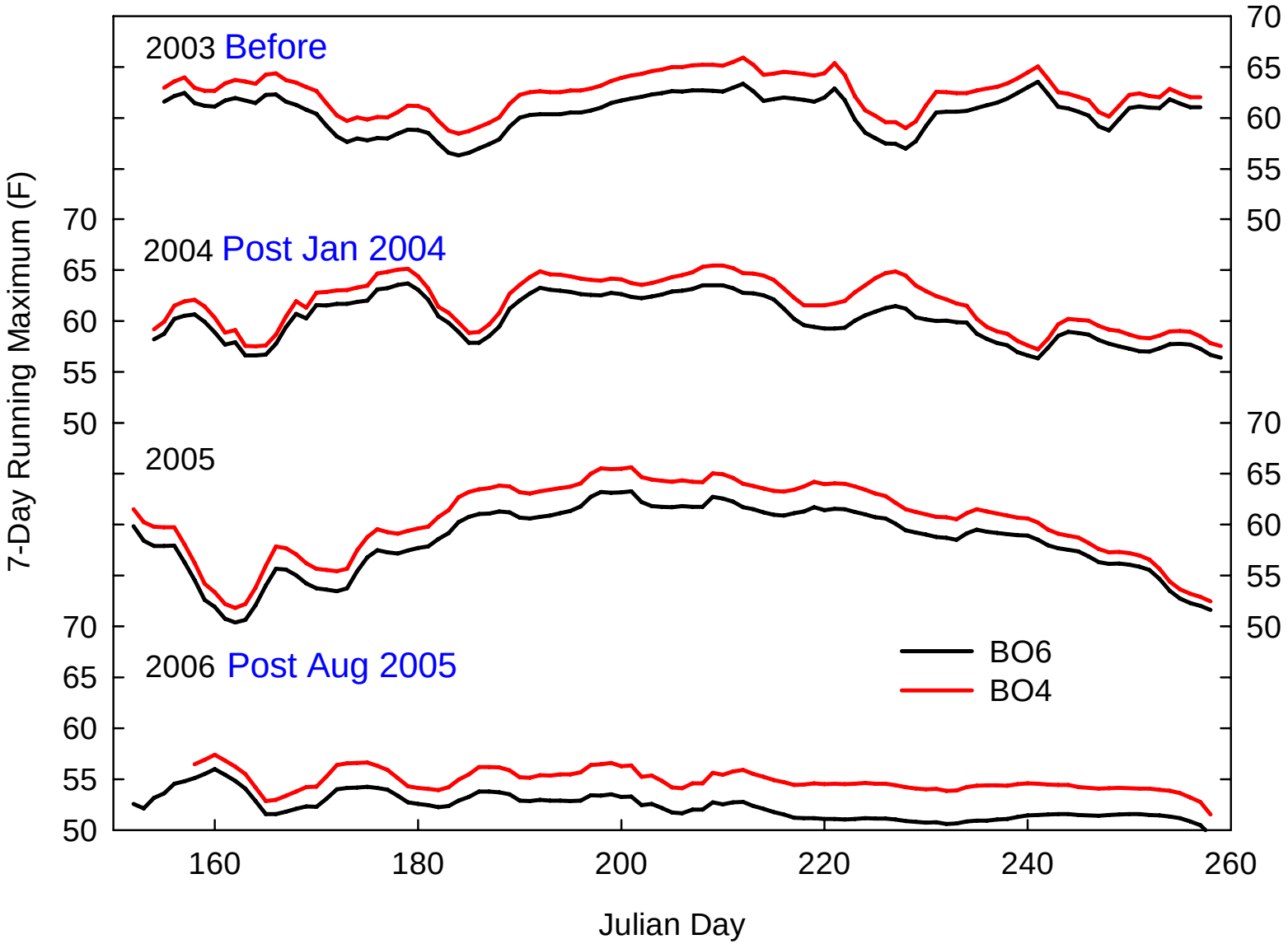


Stream Temperature

Test for change between upstream and downstream sites before and after conifer removal



Bogard Creek above (BO6) and below (BO4) aspen enhancement stand.



No water quality impact detected to date

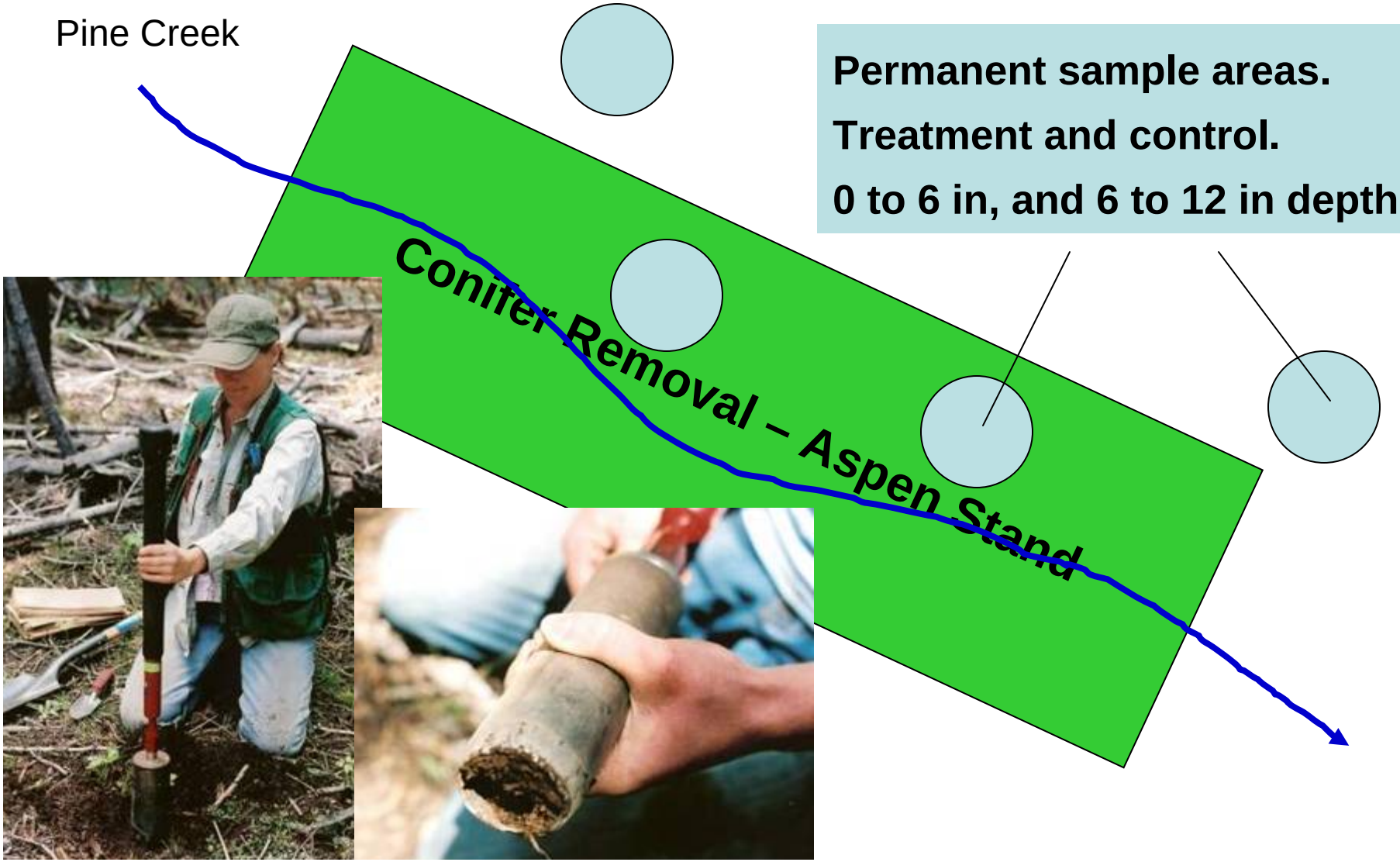
- >60% of samples <0.05 ppm for NO_3-N, NH_4-N, PO_4-P.
- Mean turbidity < 4 ntu.
- Mean TSS < 15 ppm.
- Mean day DO ~ 6.9 mg/L
- Mean pH ~ 7.5
- Mean E.C. ~ 90 ds/dm

Macroinvertabrate metrics for Bogard Creek sample stations collected June-July 2003 and 2004.

	BO1		BO4		BO6	
Metric	2003	2004	2003	2004	2003	2004
No. Families	15.0	13.0	17.0	16.5	11.5	20.0
Diversity	2.47	2.26	2.83	2.09	2.00	2.22
% Tolerant	0.0	0.0	0.0	0.0	0.0	0.0
% Intolerant	28.0	44.7	24.3	12.8	28.9	11.0
% Dominant Taxa	20.1	21.2	36.9	45.4	38.8	42.5
% EPT	46.4	60.8	40.7	39.6	35.4	35.9
% Diptera	45.2	36.3	52.2	35.9	54.9	20.2
% Chironomidae	23.8	24.0	10.3	49.2	16.0	16.2

Soil Compaction - Bulk Density

Test for change before and after conifer removal



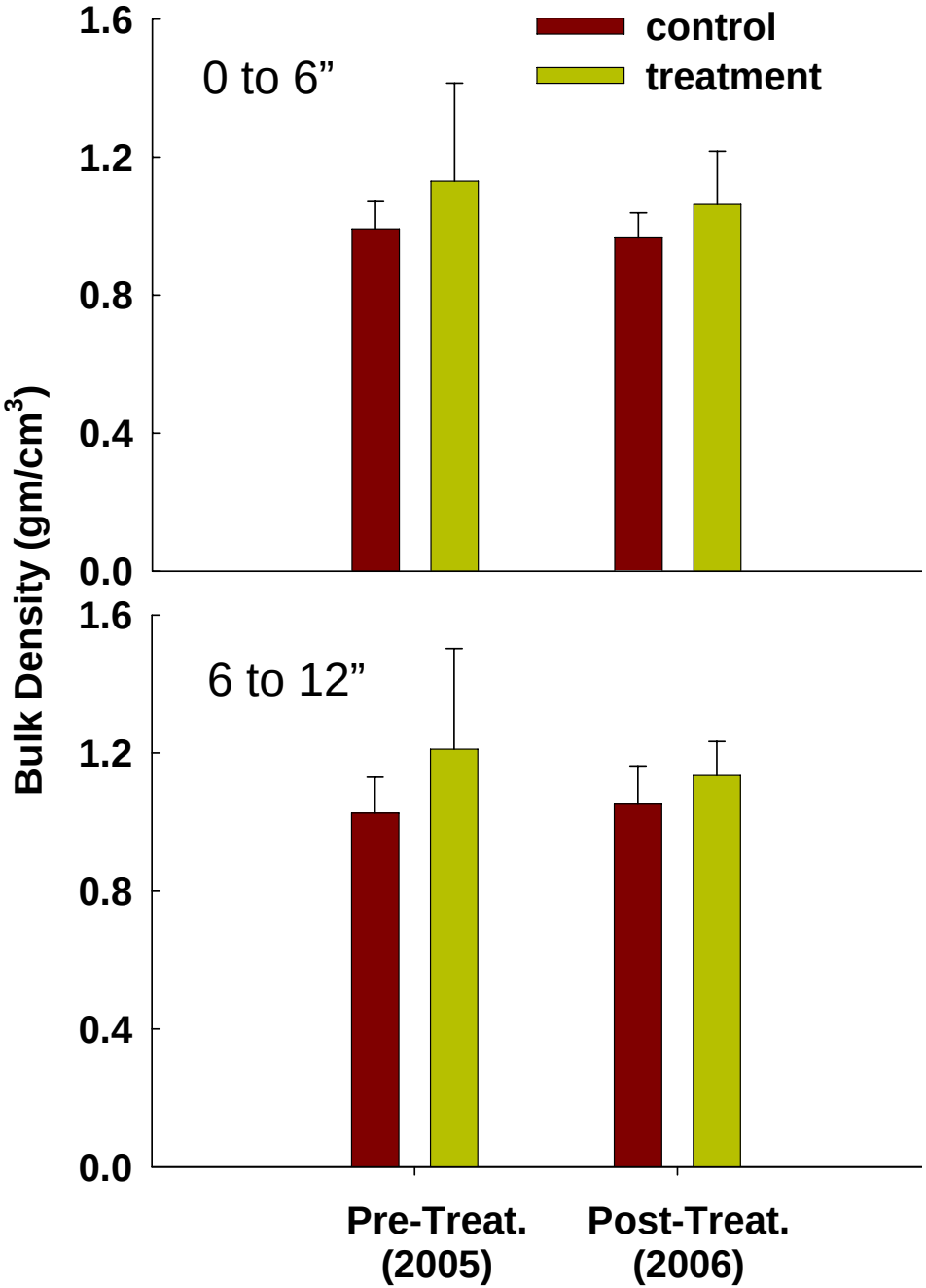
Permanent sample areas.

Treatment and control.

0 to 6 in, and 6 to 12 in depth.

Soil Compaction

- Soil surface (p=0.21)
- Subsurface (p=0.88)
- Bulk density was not increased in riparian soils due to 2005 Fall Release.



Conclusion

- ✓ No detection of long-term negative impacts to stream attributes
- ✓ Monitoring efforts have contributed to understanding the effects of restoration treatments and improved our treatment methods.
- ✓ Fundamental in gaining internal and external support (e.g. Received a letter of support from Sierra Forest Legacy for taking a science-based approach for restoring aspen communities)

Outreach

Annual Reports

- 2004 progress report
- 2006 annual report

Presentations

- 2005 presentation to Lassen Forest
- 2007 presentation to Lassen Forest

Professional Presentations

- 2004 Western Wildlife Society
- 2005 R5 Range and Hydrology Workshop
- 2007 Society of Range Management

  Pine Creek CRMP

  Aspen Society and Management

Key Field Tours

- 2003 Forest Personnel – review

  Rocky Mountain Elk Foundation

  QLG Field Review
- 2004 Aspen and Riparian Workshop

  QLG Field Review
- 2005 Pine Creek CRMP
- 2006 RCD field tour
- 2007 Forest Service – province wide

  Aspen Ecology & Management Seminar

Application of Results

- ✓ 7 aspen enhancement projects passed in 07 without appeal on LNF
- ✓ 7 aspen projects planned for 2008 on ELRD and ALRD
- ✓ Remaining aspen scheduled to be covered under NEPA in next 6 years on ELRD