

Effectiveness of Michigan SMZs for Temperature Control



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Michigan SAF Spring Conf. | Marquette, MI | March 30, 2017

“Forests for Fish”



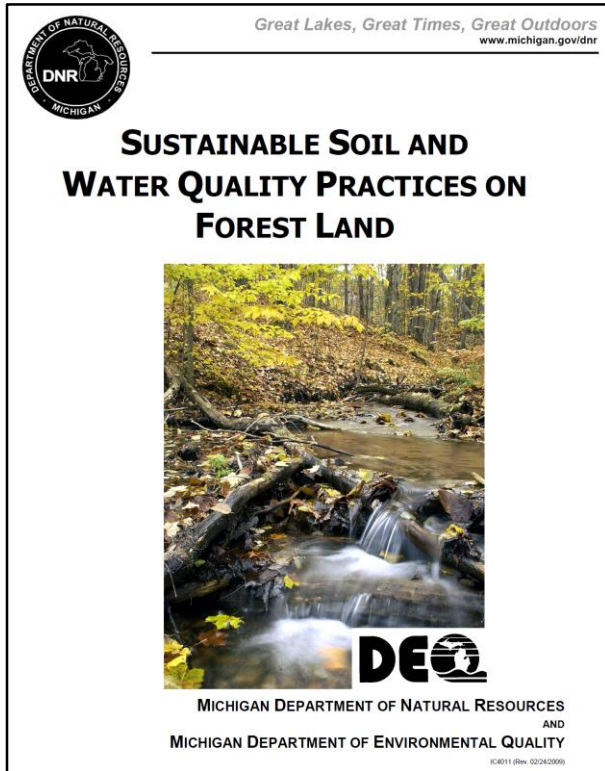
Discussion Topics

- **Review Michigan SMZ/RMZ requirements;**
- **Thermal requirements for trout;**
- **Present results of a study that Weyerhaeuser undertook to evaluate effectiveness of site-specific SMZs at maintaining temperature;**
- **Explore the factors affecting temperature patterns.**



Michigan Forestry BMP and SMZs

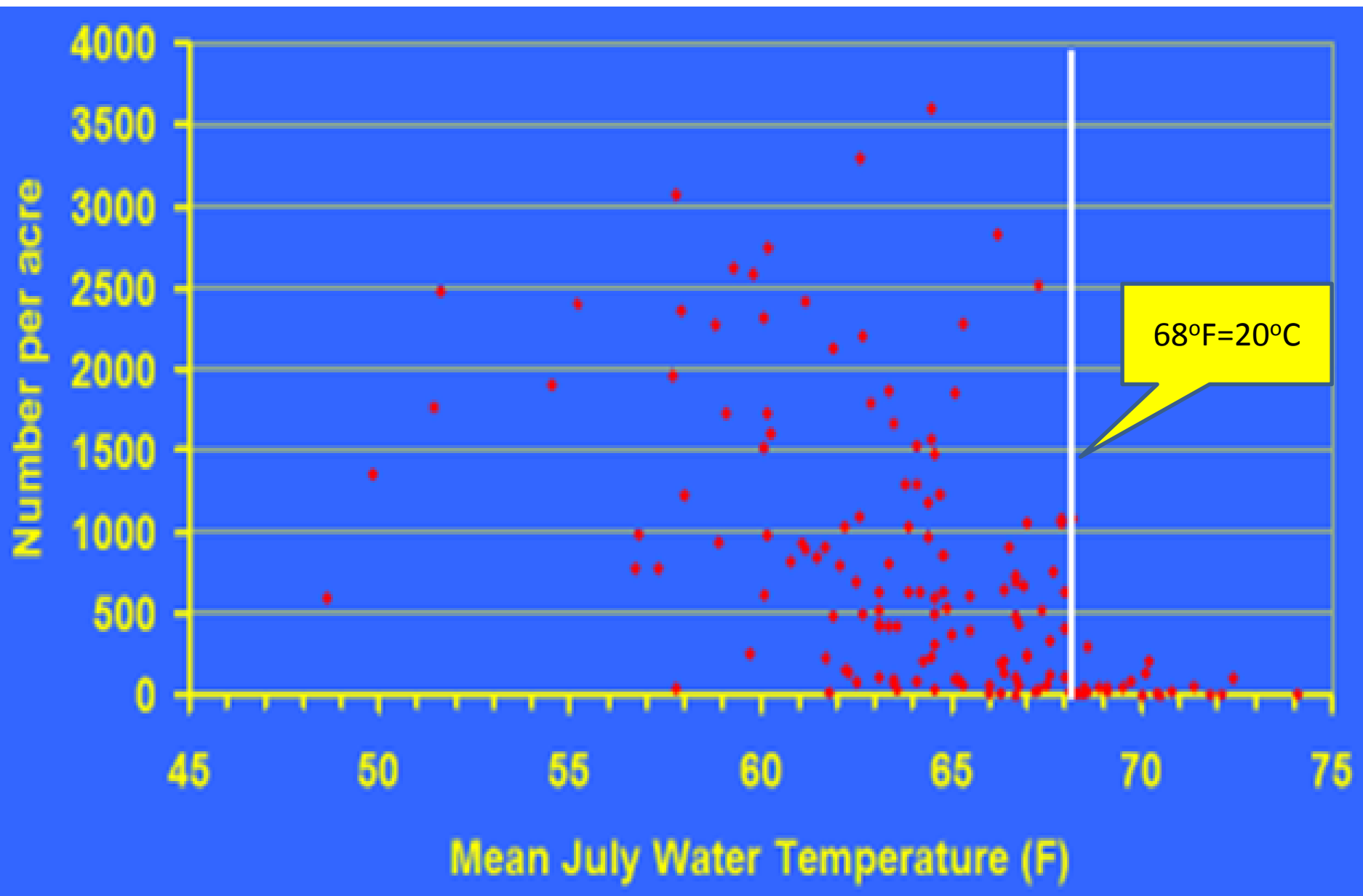
Sustainable Soil and Water Quality Practices (2009)



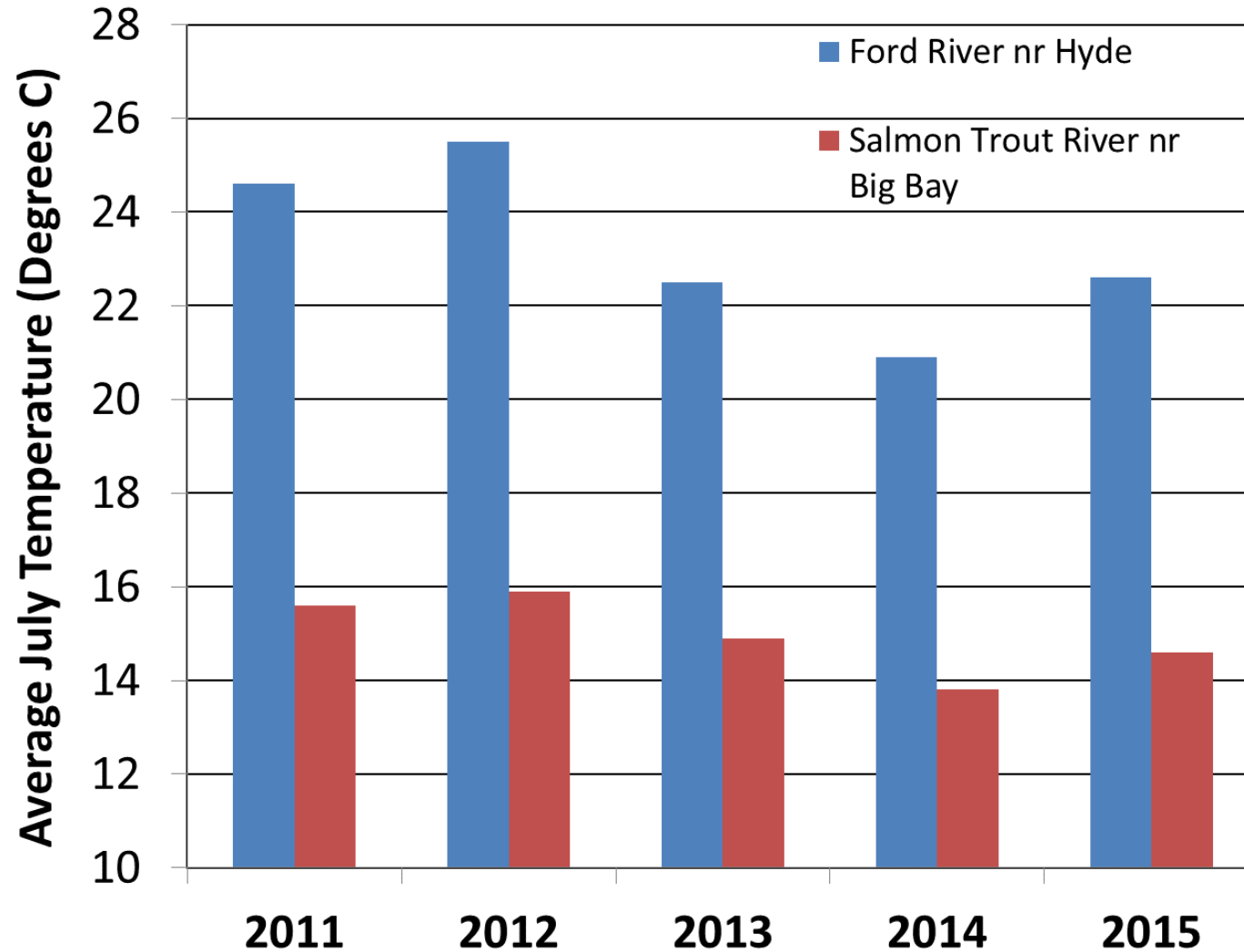
- **Standard SMZ width 100ft (30m)**
- **Can be site-specifically adjusted:**
 - Special designations: Natural Rivers, Wild and Scenic Rivers, Trout streams
 - Adjacent slope;
 - Harvest prescription or activity timing;
 - Waterbody characteristics (e.g., *perennial vs intermittent*);
 - Soils;
 - Presence of nuisance beaver and aspen; and
 - Presence of heavier soil disturbance such as roads and landings.
- **Recognized as “Acceptable Variation” in state BMP Audits... if effective.**



Trout and Stream Temperature (source Mich DNR)



Regional Stream Temperature Trends 2011-2015

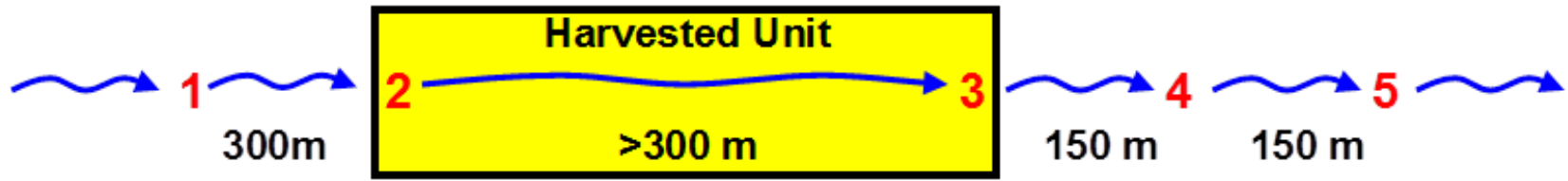


Source: US Geological Survey



Harvest Temperature Effects Study Approach

Temperature Monitoring Locations:

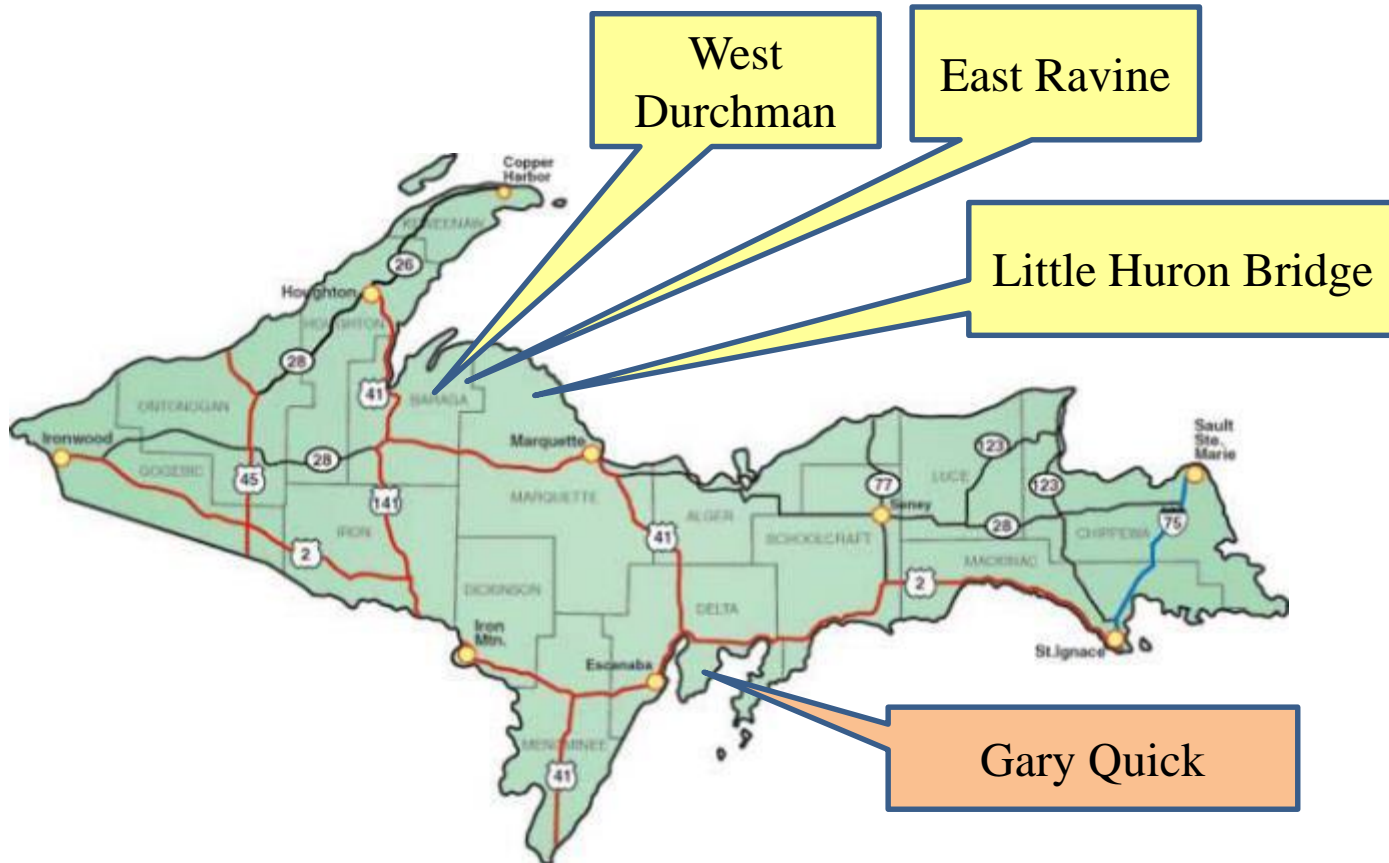


Site Criteria:

- **Fall/Winter Harvest;**
- **Small-to-Medium Perennial Stream;**
- **1000 ft minimum harvest distance (one or both sides of stream).**
- **No additional upstream streamside harvest for duration of study**



Harvest Effects Study Sites



-  Designated Trout Stream
-  Undesignated Stream



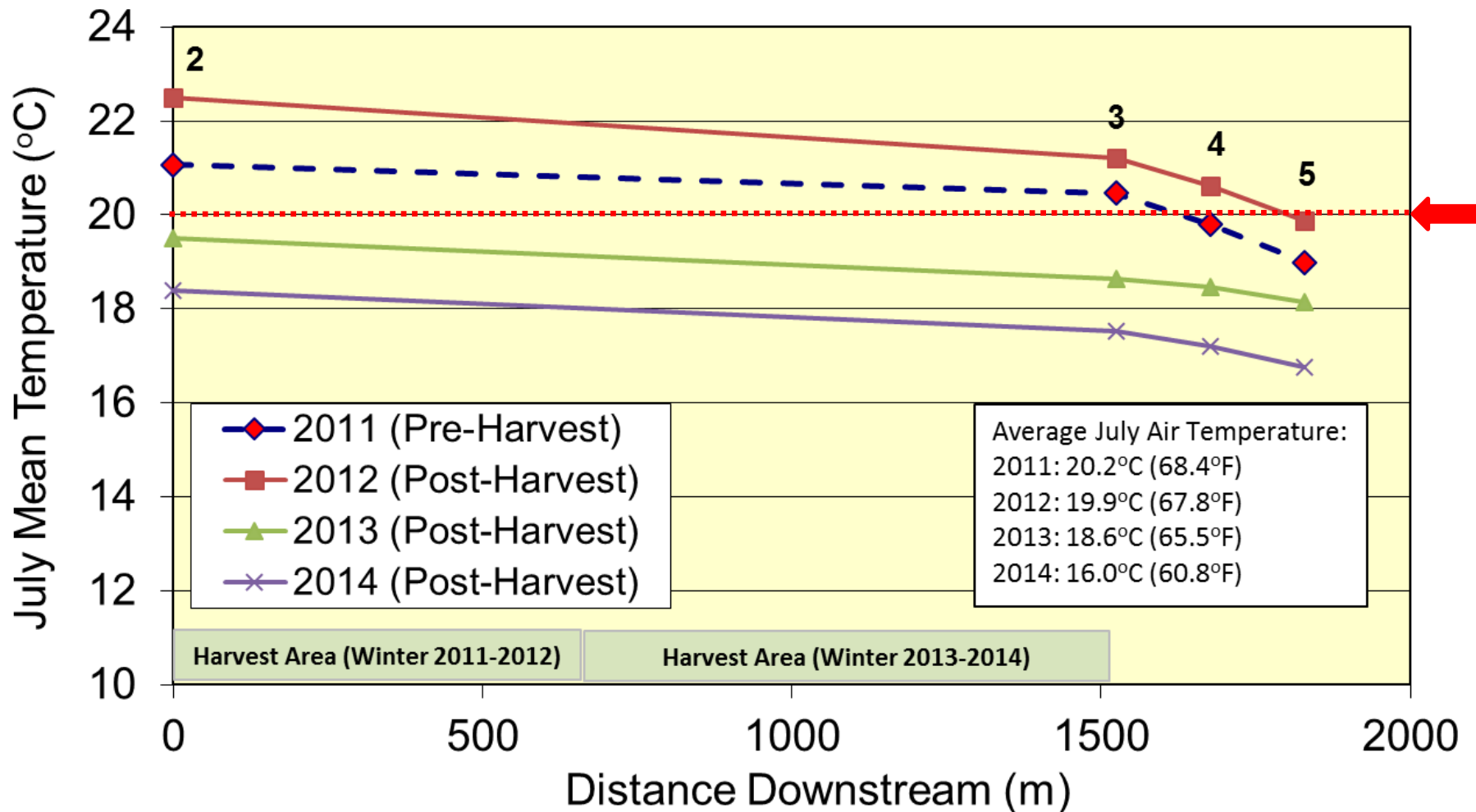
West Durchman



West Durchman



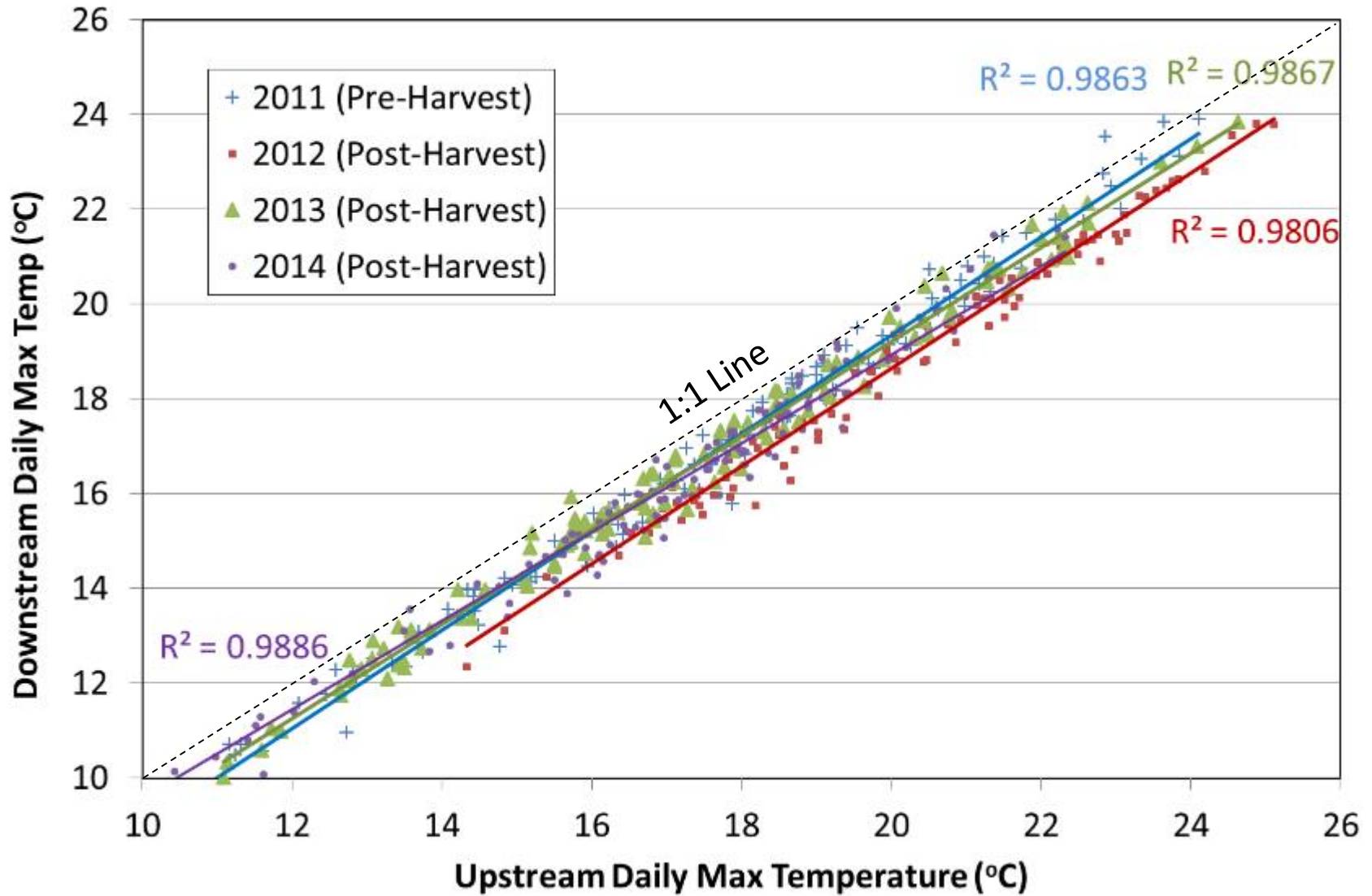
West Durchman



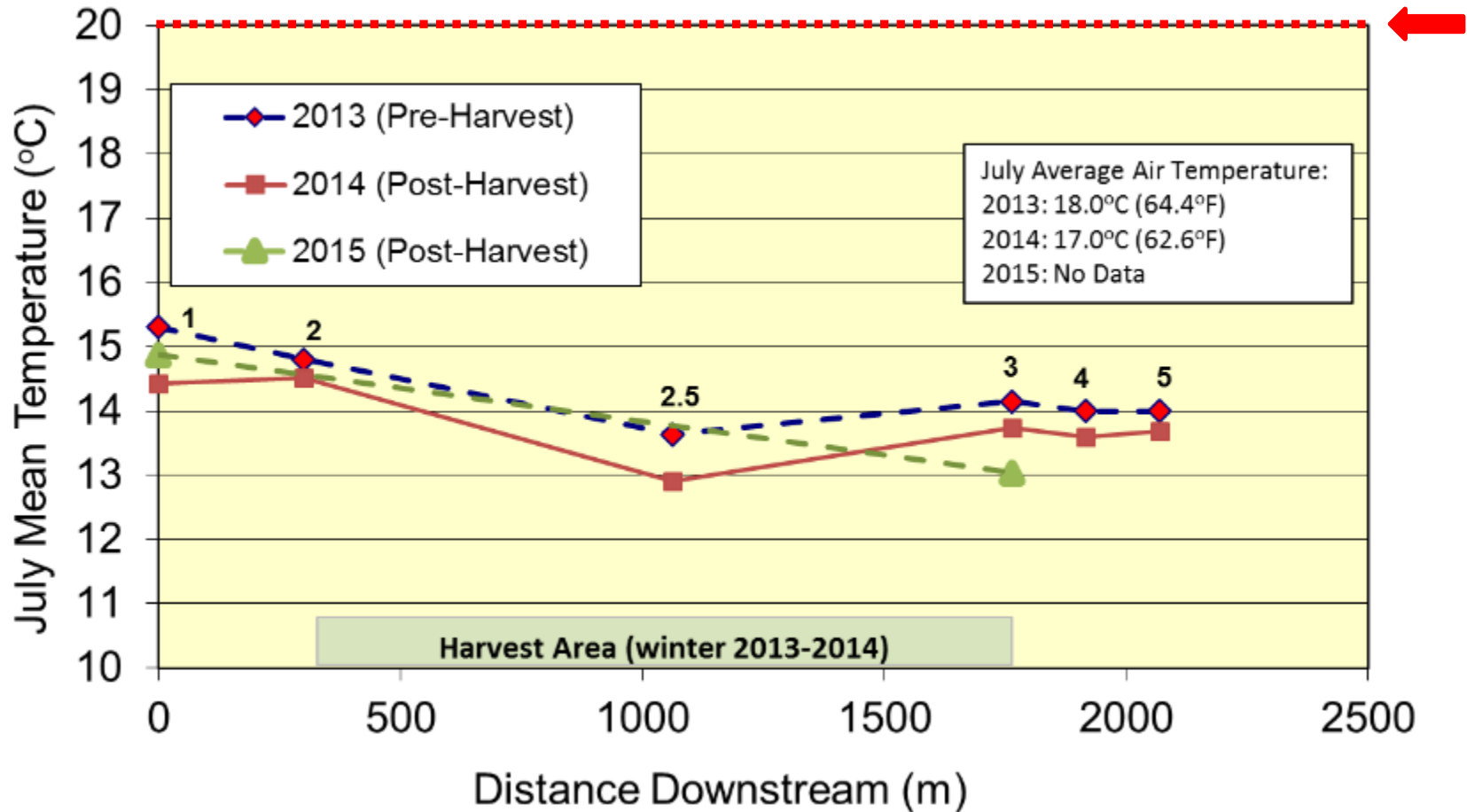
| Elevation | Canopy Cover | Harvest Prescription | SMZ Width | SMZ Length | SMZ Harvest Details |
|--------------------|-------------------------|---|-----------------|---------------------|-------------------------|
| 1692 ft (516 m) | Pre = 57% Post = 57% | Hardwood Selection, Post-Harvest BA 60-70 | 66 ft (20 m) | 5000 ft (1524 m) | North Side (no cut SMZ) |



West Durchman



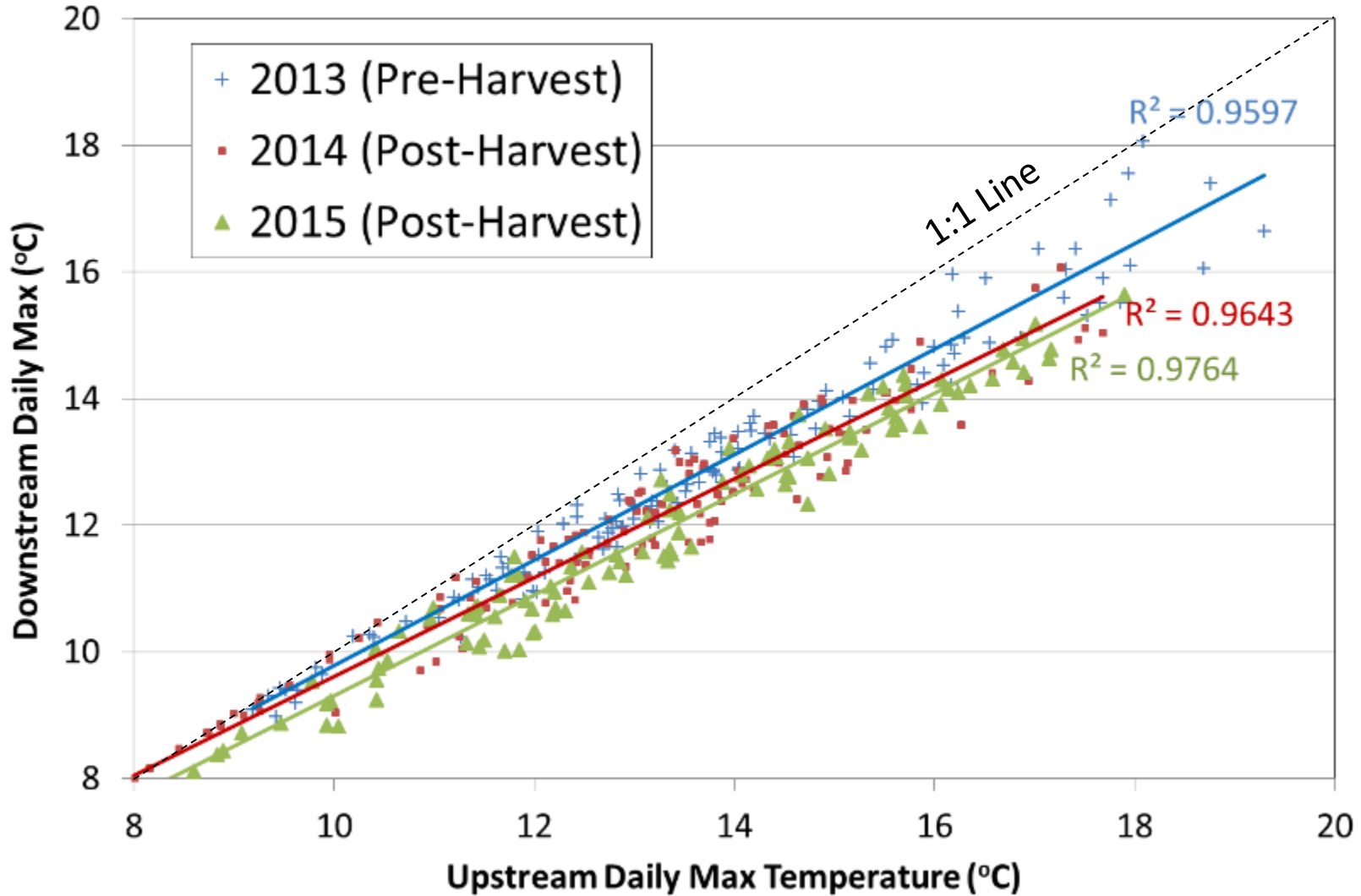
Little Huron Bridge



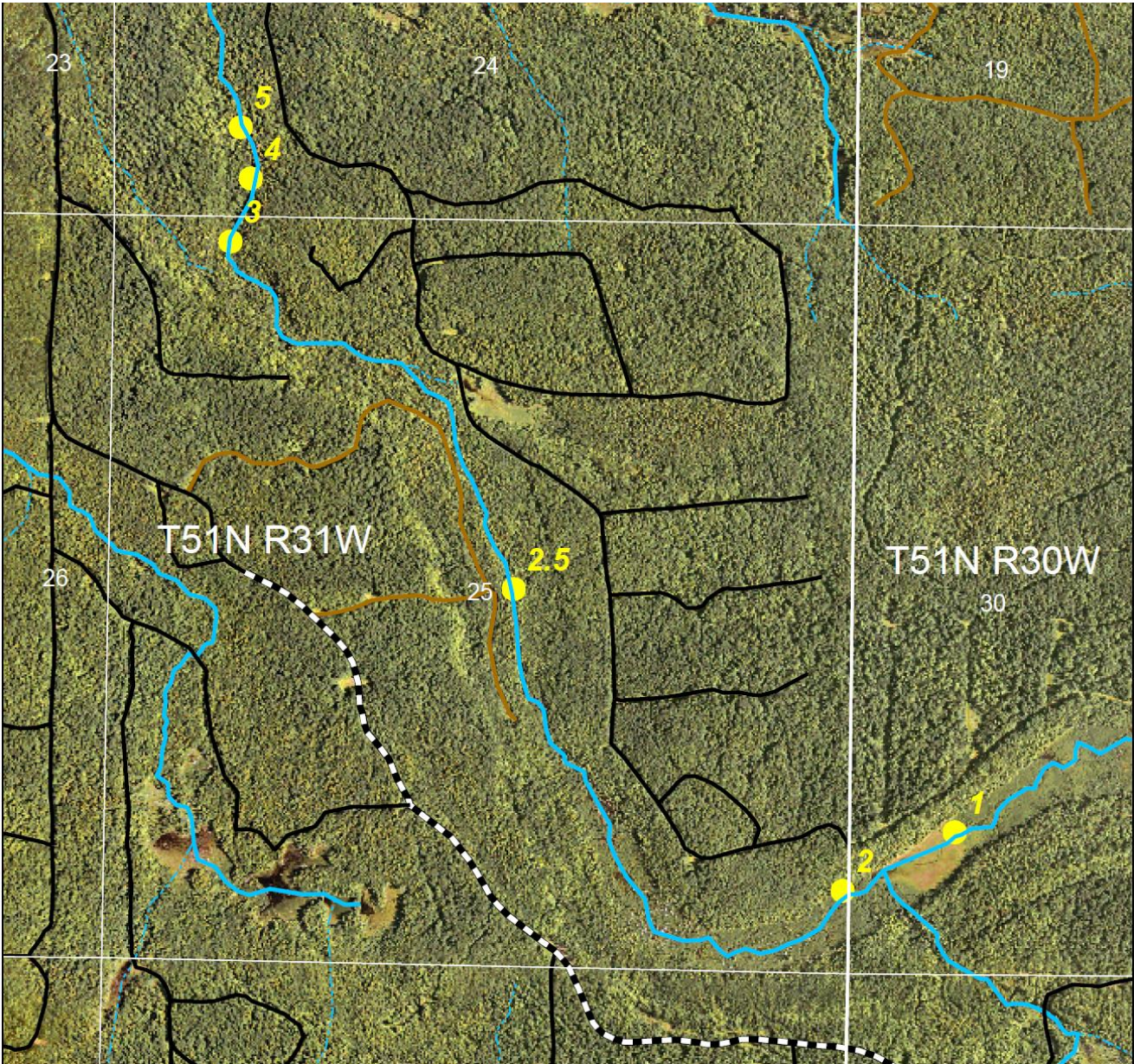
| Elevation | Canopy Cover | Harvest Prescription | SMZ Width | SMZ Length | SMZ Harvest Details |
|-------------------|-------------------------|---|-----------------|---------------------|------------------------|
| 794 ft (242 m) | Pre = 75% Post = 80% | Hardwood Selection, Post-Harvest BA 60-70. Some pockets of hemlock with residual BA of 80-90. | 66 ft (20 m) | 4800 ft (1463 m) | East Side (no cut SMZ) |



Little Huron Bridge



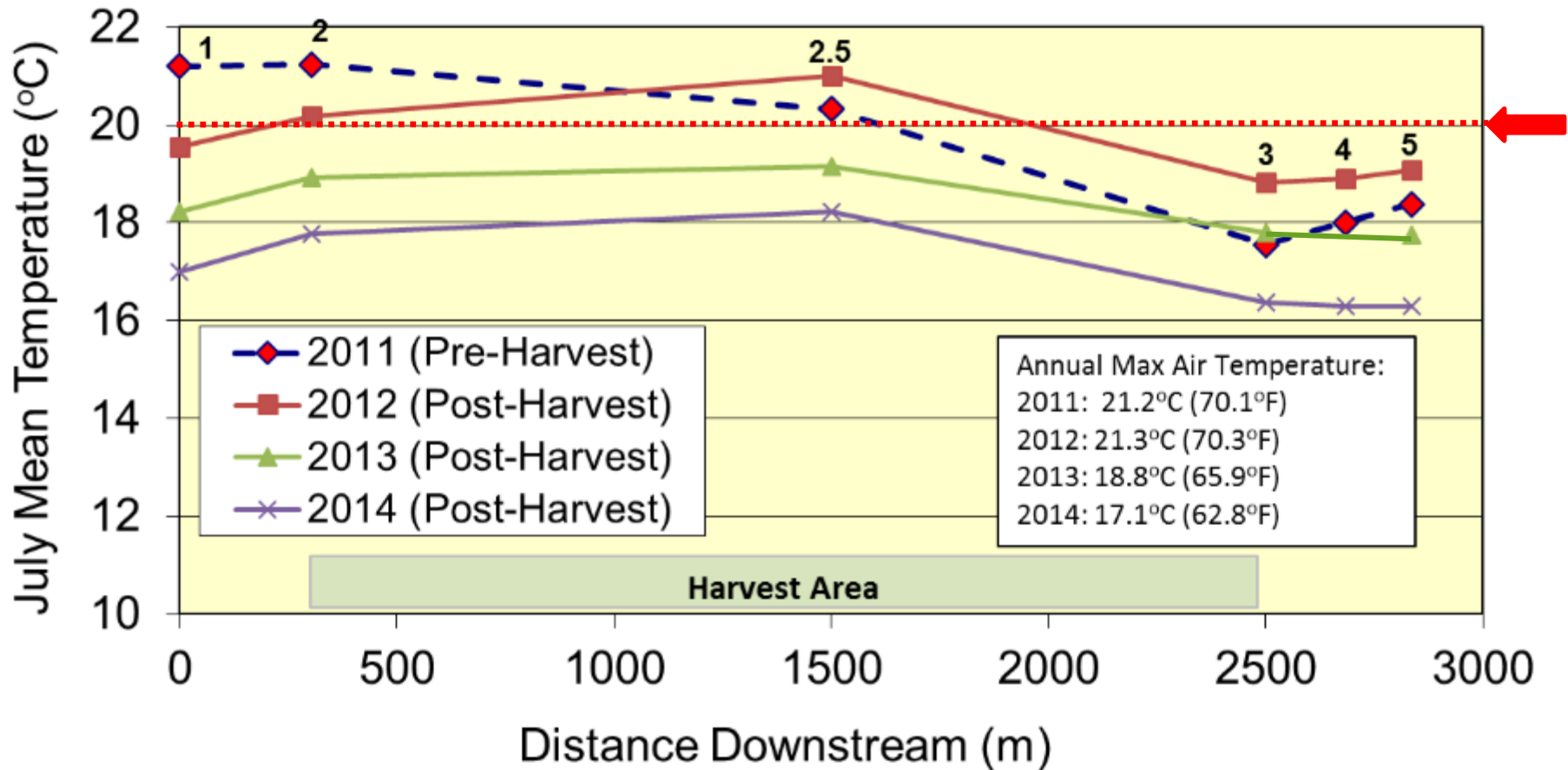
East Ravine



East Ravine Above Harvest



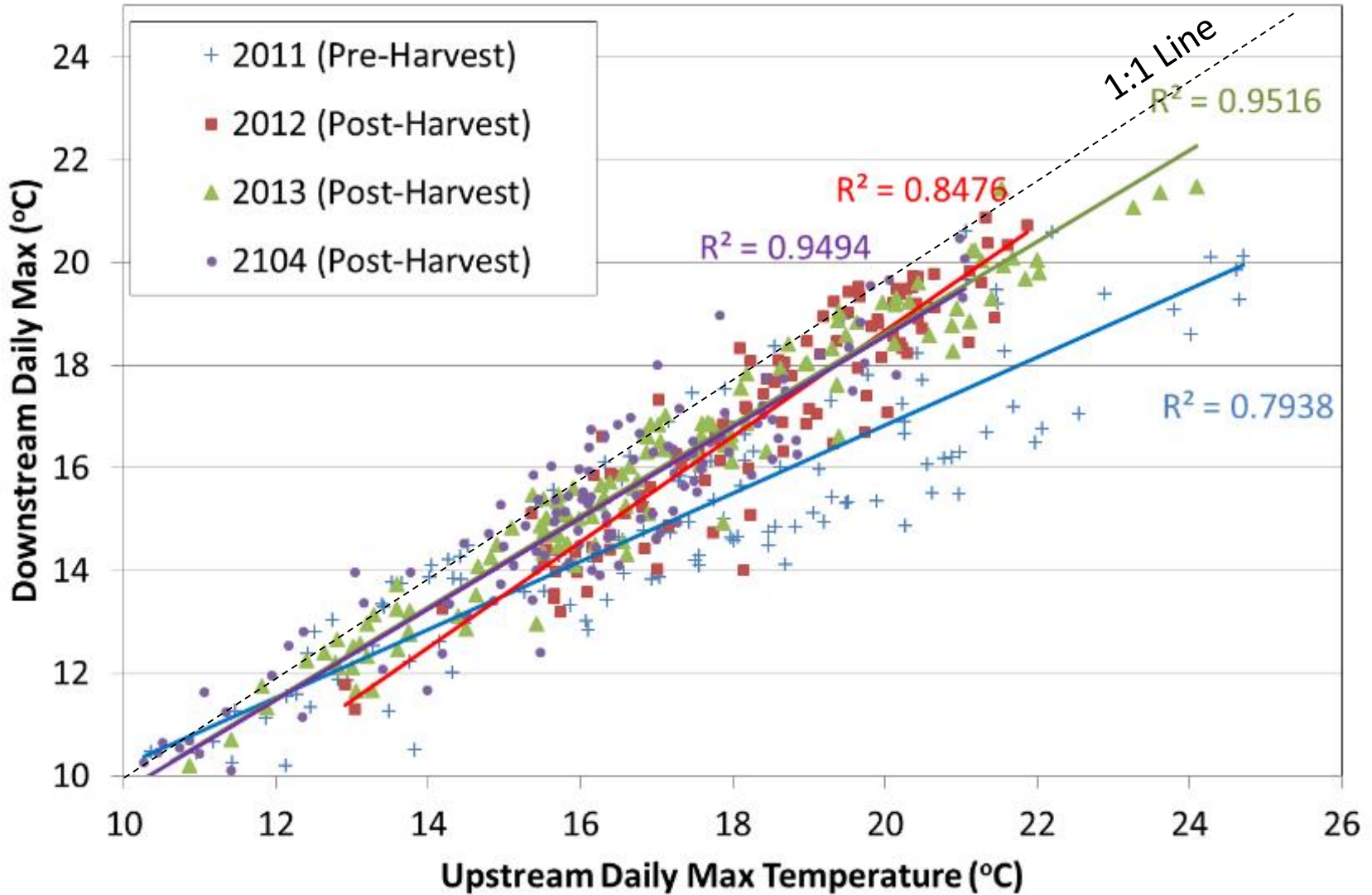
East Ravine



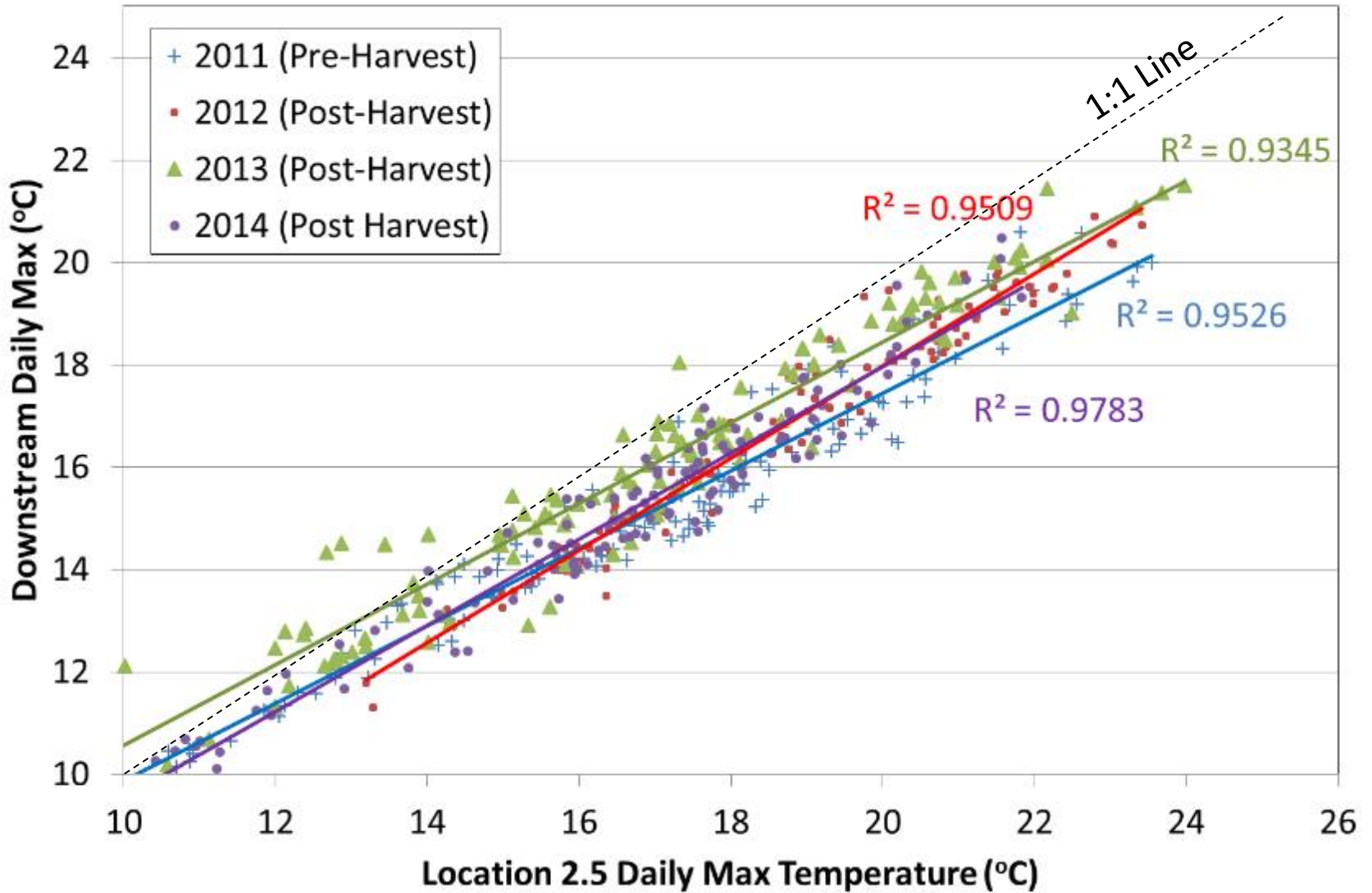
| Elevation | Canopy Cover | Harvest Prescription | SMZ Width | SMZ Length | SMZ Harvest Details |
|--------------------|-------------------------|---|------------------|---------------------|-------------------------|
| 1207 ft (368 m) | Pre = 75% Post = 75% | Hardwood Selection, Post- Harvest BA 60-70 | 100 ft (30 m) | 7200 ft (2200 m) | North Side (no cut SMZ) |



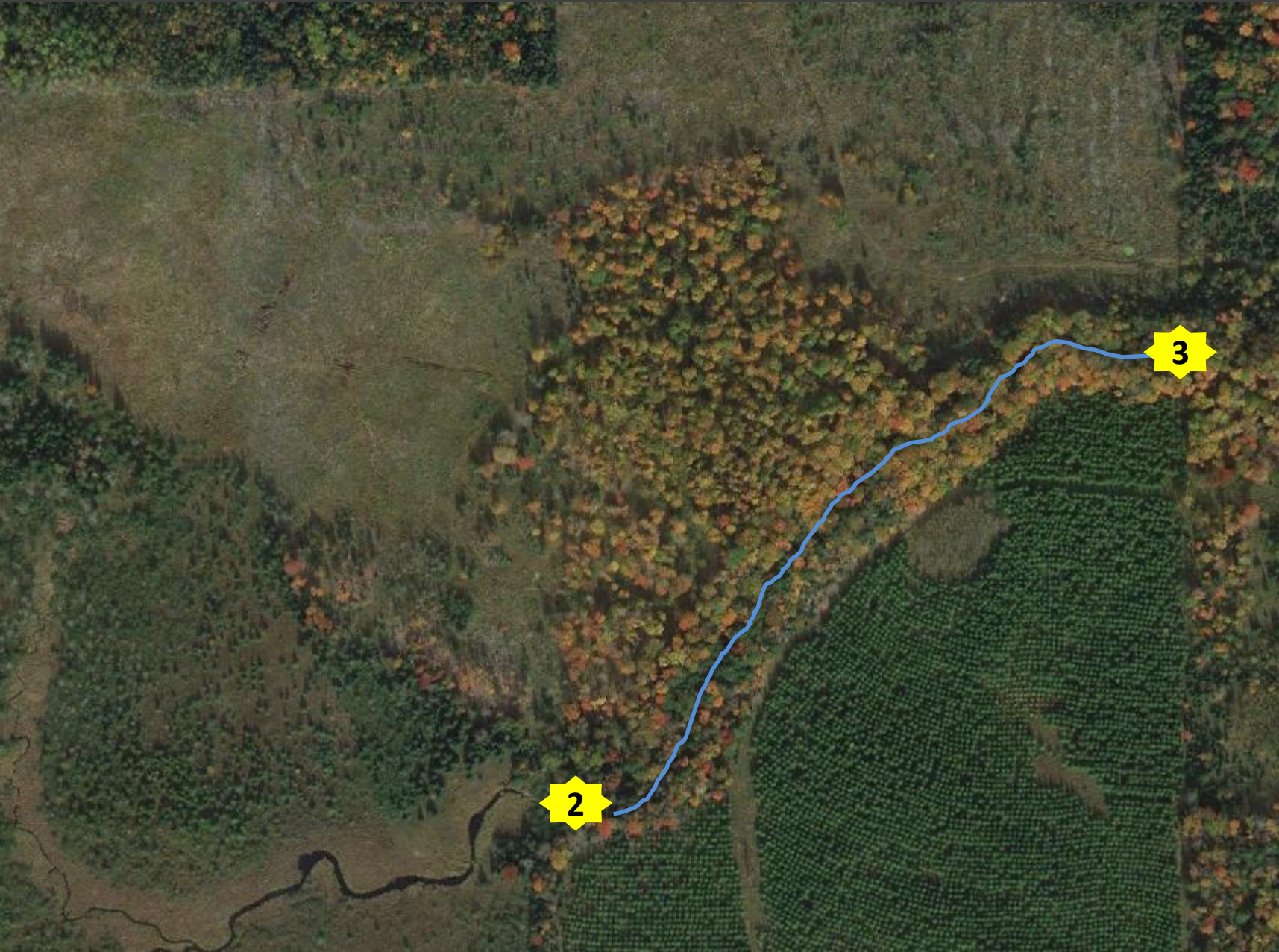
East Ravine



East Ravine



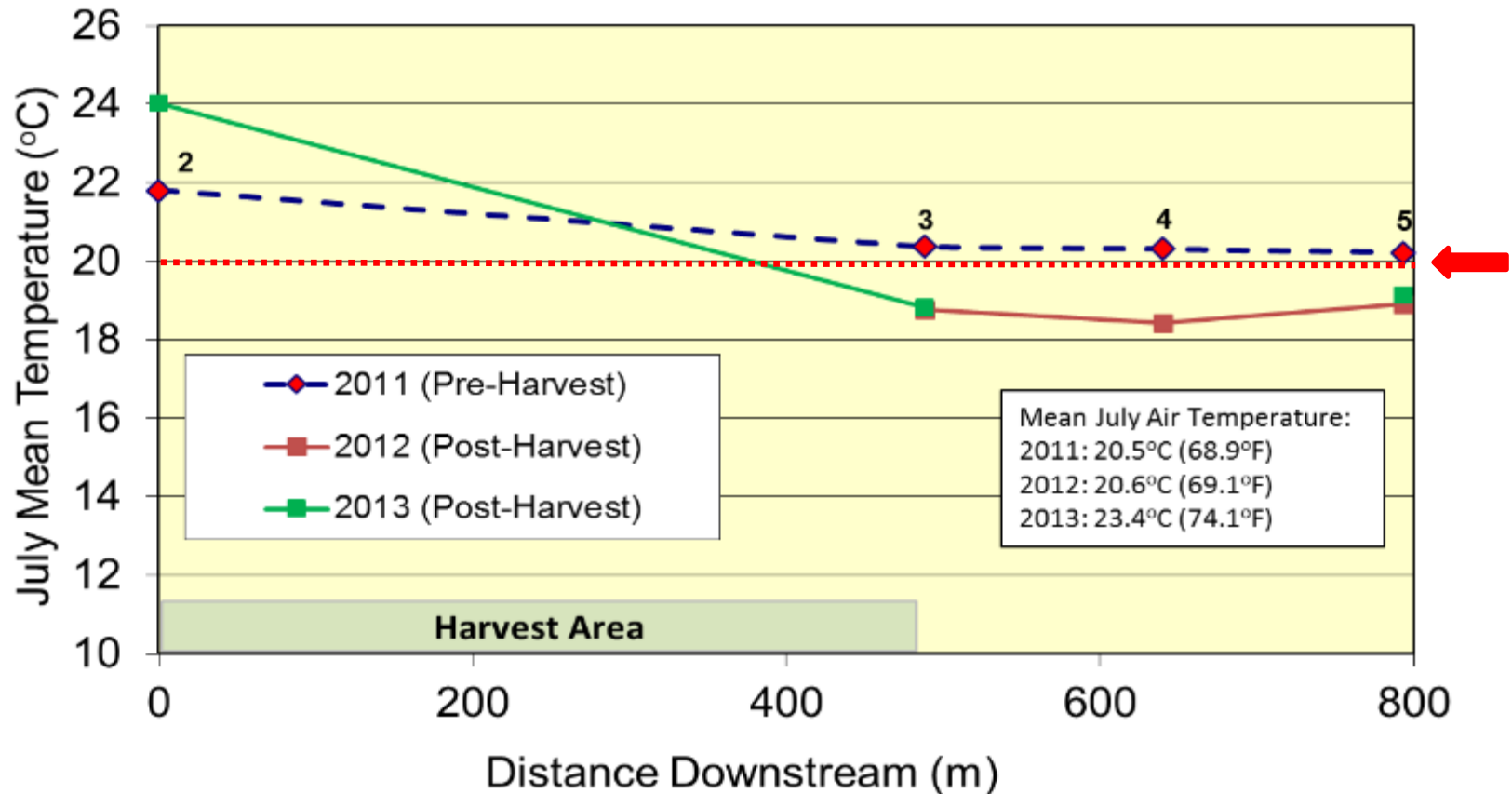
Gary Quick Harvest



Gary Quick SMZ



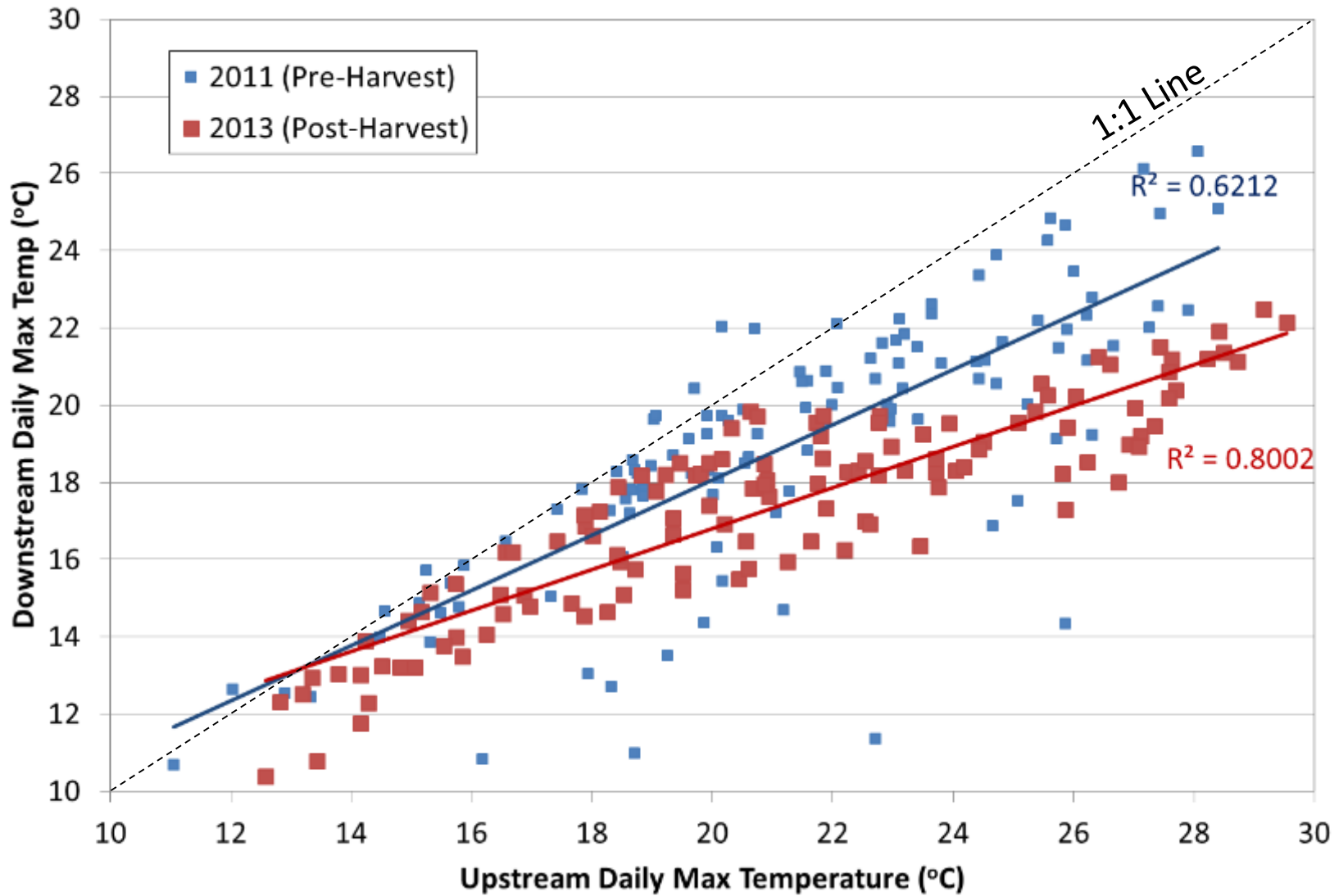
Gary Quick



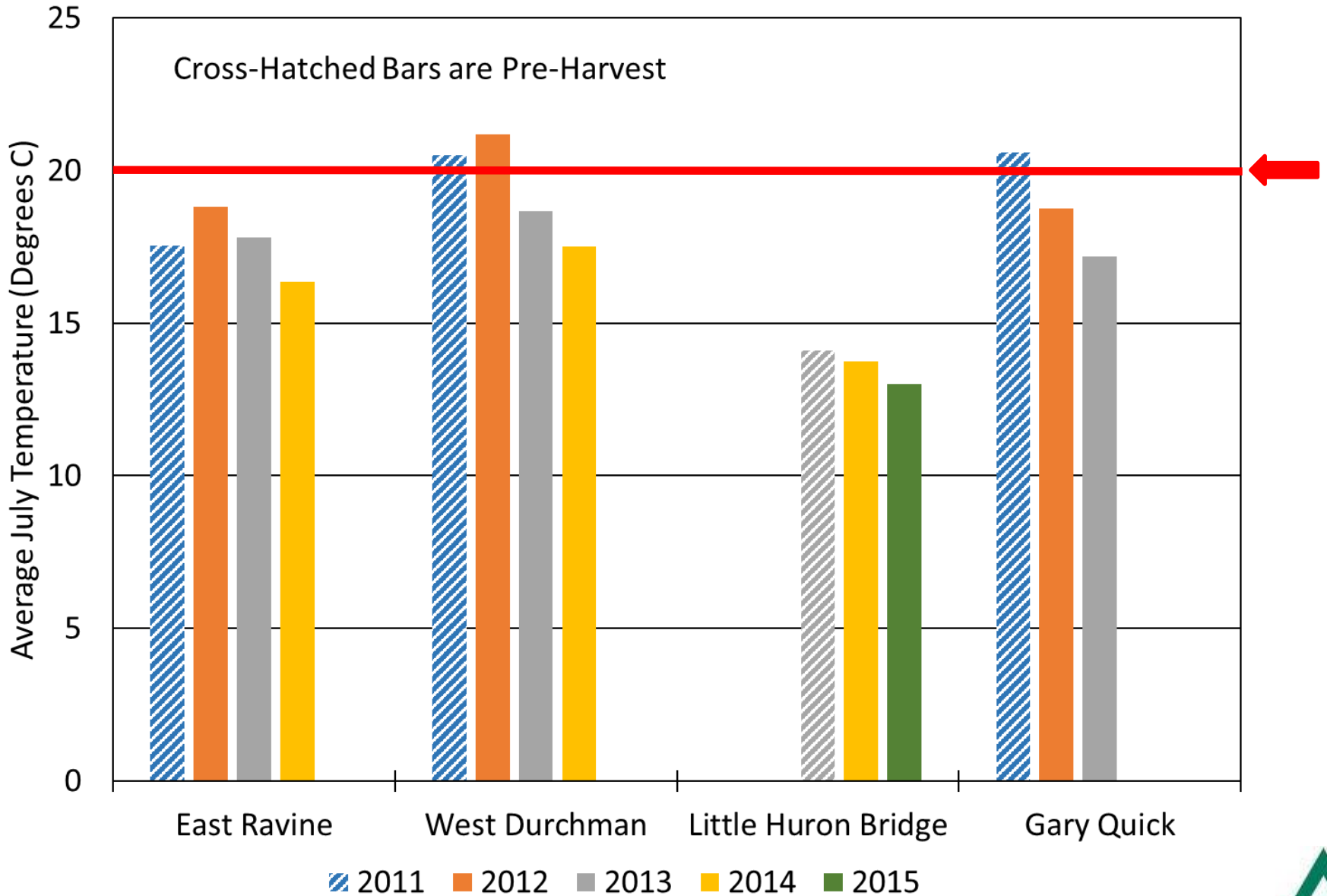
| Elevation | Canopy Cover | Harvest Prescription | SMZ Width | SMZ Length | SMZ Harvest Details |
|-------------------|-----------------------------|--|----------------|--------------------|-------------------------|
| 636 ft (194 m) | Pre = No Data Post = 87% | Aspen Clearcut and Hardwood Selection | 50 ft (15m) | 1600 ft (488 m) | North Side (no cut SMZ) |



Gary Quick



Trout Suitability



Conclusions

- **Studied four operational harvest units in the period 2011-2015;**
 - Buffers ranged from 50-100 feet wide;
 - Partial cuts (60-70 BA retained);
 - 1 site included some clearcut;
 - Little or no tree removals within SMZ.
 - North and east side harvesting (single side of stream)
- **While results were complicated by upstream wetlands and dewatering, we saw no obvious evidence that these timber harvests increased stream temperatures;**



Conclusions (continued)

- **Presence of wetlands important. Appears that streams can warm and cool with distance along the stream;**
- **Mean July temperatures suggest that these stream reaches are generally suited to trout, consistent with state mapping;**
- **Added confidence in results could be obtained with more replication.**



Acknowledgements

Weyerhaeuser: *Ray Ary, Bruce Maki, Vic Lyberg, Andy Solka, Howard Lindberg, Charlie Becker.*

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