Forestry Best Management Practices to Protect and Preserve Water Quality

Healthy Forests are Managed Forests.

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Main Premises of this Presentation:

* A well-managed forest is a healthy forest.
* Healthy forests produce superior water quality when compared with any other land use.
* Forests can be intensively managed to achieve forest health and provide economic returns to landowners and still provide superior water quality, if forestry Best Management Practices (BMPs) are followed.

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To have healthy forests that produce superior water quality, forests need to be managed.

Forest Thinning

- Reducing forest biomass loading by forest thinning can significantly reduce wildfire risk.

Forest Thinning

* Forest Thinning results in removal of diseased trees, improving stand health.
* This trees are not valuable as traditional wood products like lumber.
* Infected trees are more susceptible to insect attack.
* Control invasive and exotic species.

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Forest Biomass Removal

* Residual forest biomass loads are often too great to allow for forest replanting to occur.
* This excess biomass may also result in increased wildfire risk.

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Prescribed Fire – reduces potential for destructive wildfires and protect water.

Forest Clearcutting – The most ecologically and economically efficient means of regenerating shade-intolerant southern pines.

Forests can be managed intensively and still provide high quality water if BMPs are used.

* Forestry BMPs were developed in response to the 1972 Clean Water Act.
* Guidelines vary by state, but research across the USA has shown that BMPs are very effective in protecting water quality.
* BMPs have evolved over time with the forest industry and are continually being refined to further enhance their performance.

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Critical BMPs Include

* Streamside Management Zones – buffers on intermittent and perennial streams, 100' minimum total width, 50 ft2 overall basal area.
* Roads – well-maintained and not directly contributing sediment to streams excessively
* Log Sets (decks or landings) – stabilized, free of trash, not eroding, etc.
* Skid trails – stabilized, water bars, re-vegetated, not actively eroding, etc.
* More information – Download the App:

http://texasforestinfo.tamu.edu/mobileapps/

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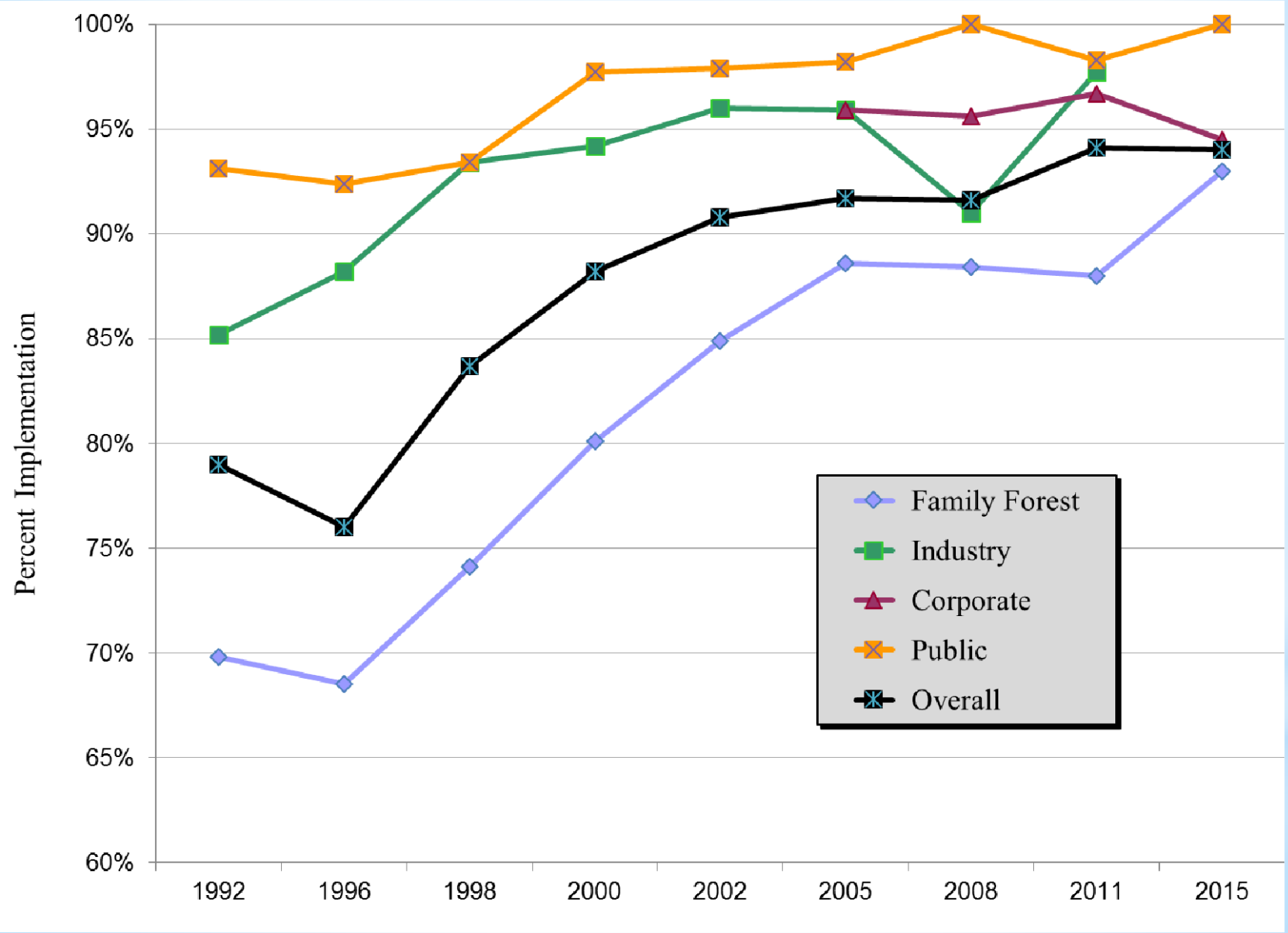
Are Voluntary BMPs Being Used?



Source: 2015 Texas A&M Forest Service BMP Implementation Report

Best Implementation Occurred When:

* A forester was involved in the sale or activity.
* The logging contractor had attended formal BMP training.
* BMPs were included in the timber sale contract.

How effective are forestry BMPs for protecting water quality?

* A series of forestry BMP implementation studies have been conducted to evaluate this question.
* This is particularly important as forest practices change and as technology improves.
* Example study – The Texas Alto Watershed Project.

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Sediment Losses from Silviculture Early 1980s

* Clearcutting followed by shear, pile, windrow burn or rollerchop and burn mechanical site-preparation.

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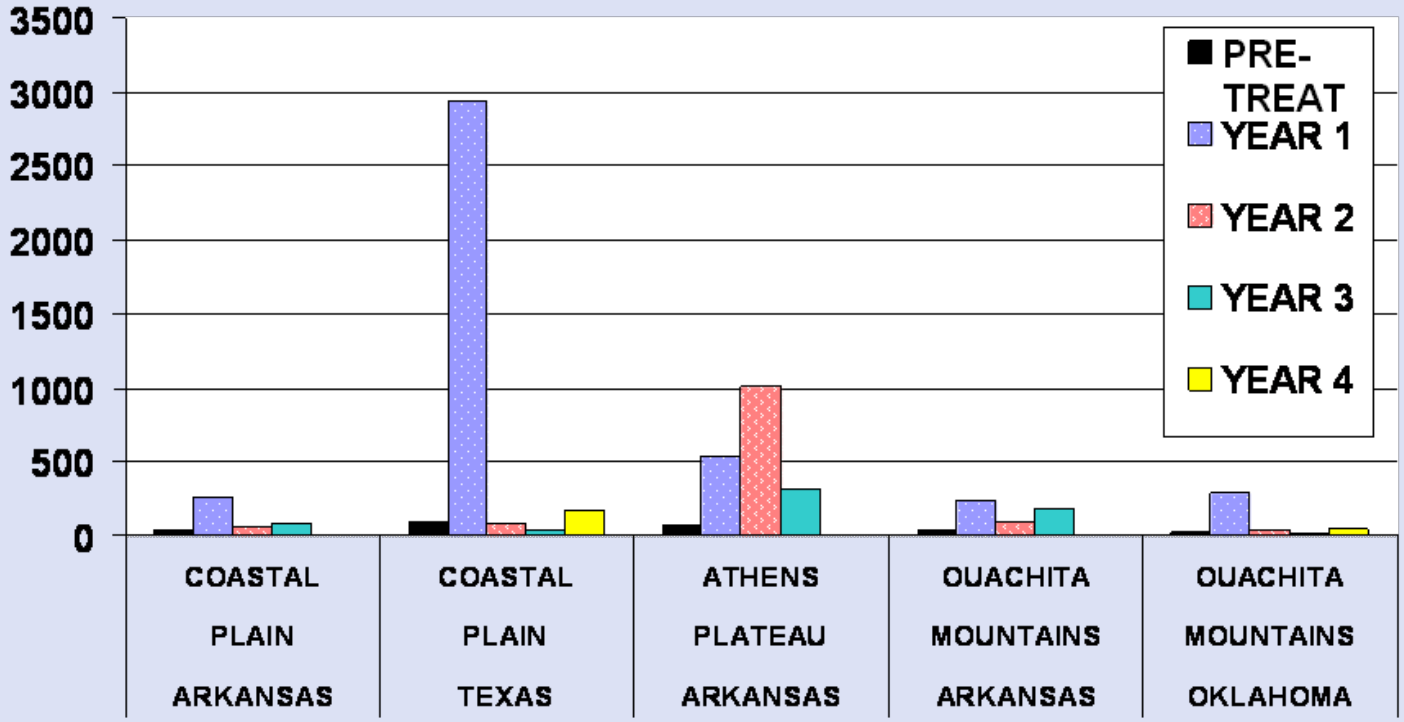
Sediment Losses from Silviculture Early 1980s – Regional Comparison



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Sediment Losses from Silviculture Today with BMPs.

* Clearcutting with broadcast and banded herbicide site-preparation, no prescribed burning.
* Contour ripping on compacted soils.

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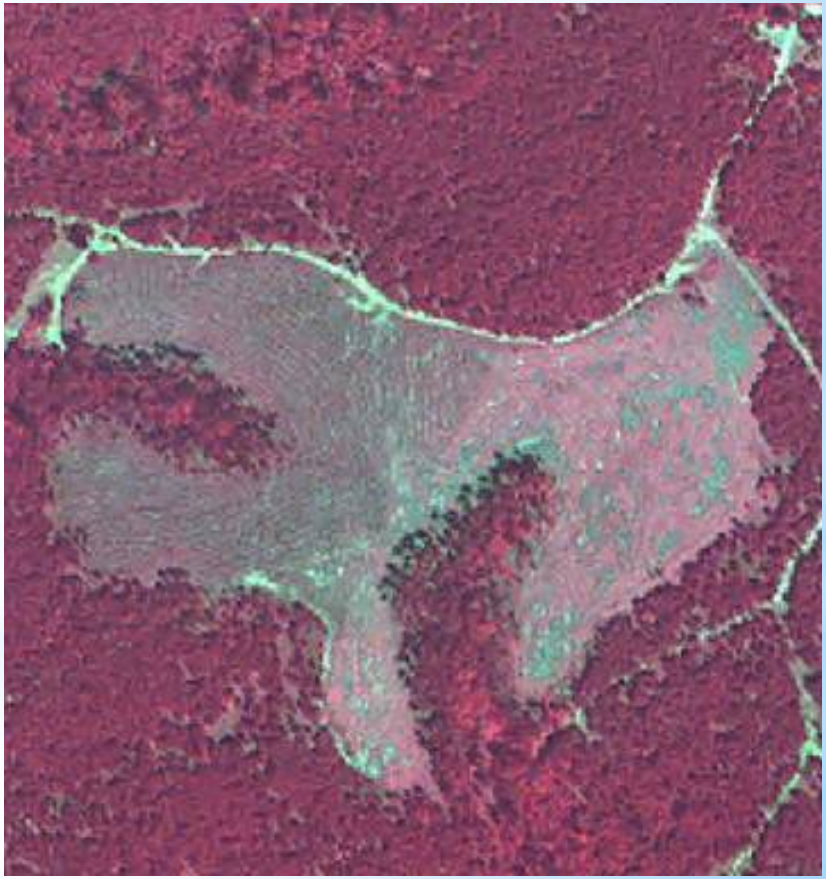
Sediment Losses from Silviculture today with BMPs

* Prior to the adoption of BMPs – limited use of streamside management zones (SMZs).
* Today, 50 ft minimum width each side.

Pre-BMP harvest, 1980



Post-BMP harvest, 2002

Sediment Losses from Silviculture Today

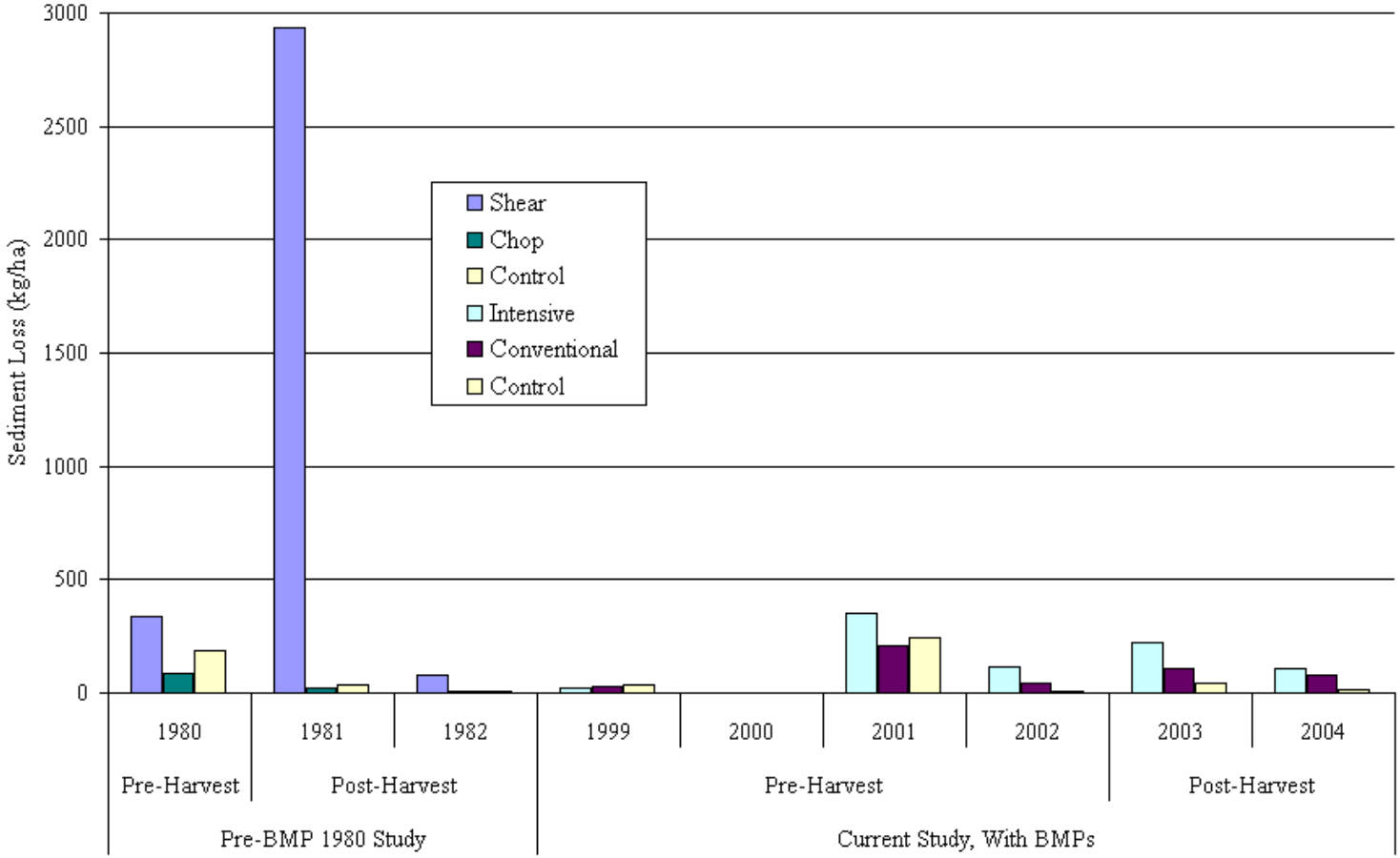


Figure 2. Average annual sediment losses (kg/ha) by treatment for the Texas Alto Watersheds for the two studies conducted (1980 versus current study).

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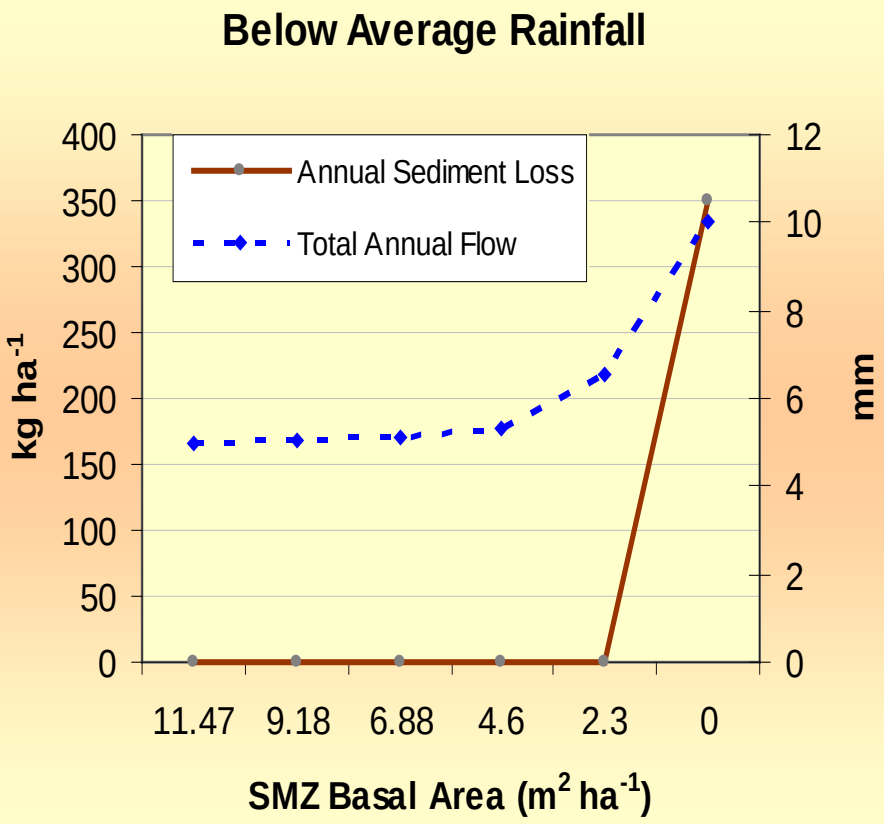

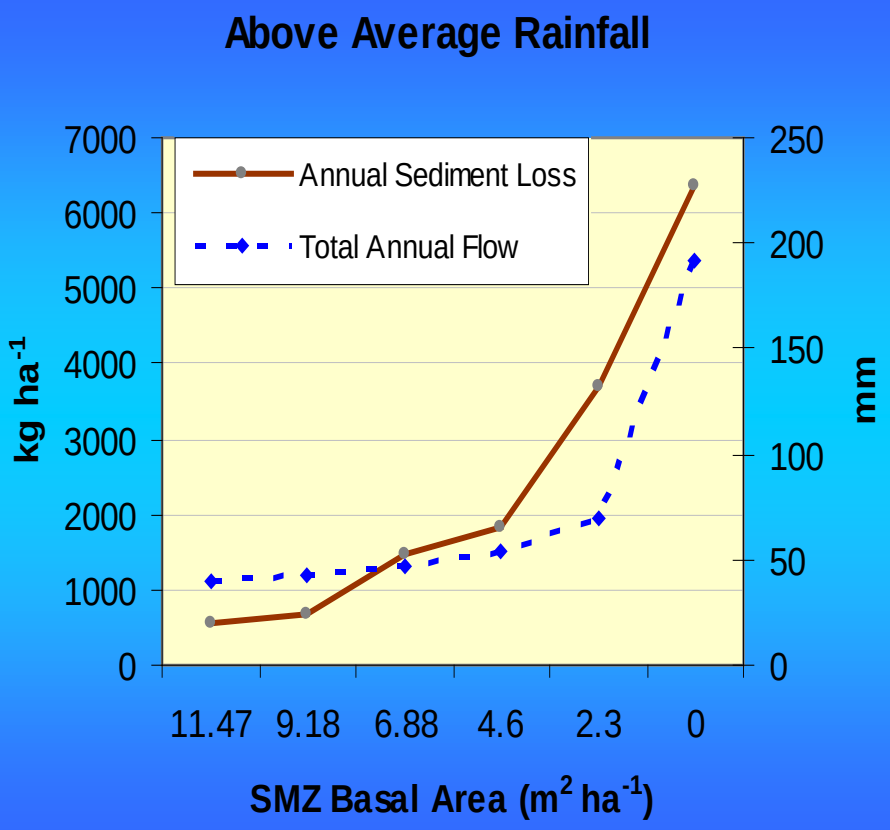

SMZs are very effective, but densities below the minimum can result in elevated sediment loss, depending on annual rainfall.

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Nutrient Runoff

Intensive silviculture with BMPs resulted in very low losses of nutrients to streams, with no negative impact on water quality.

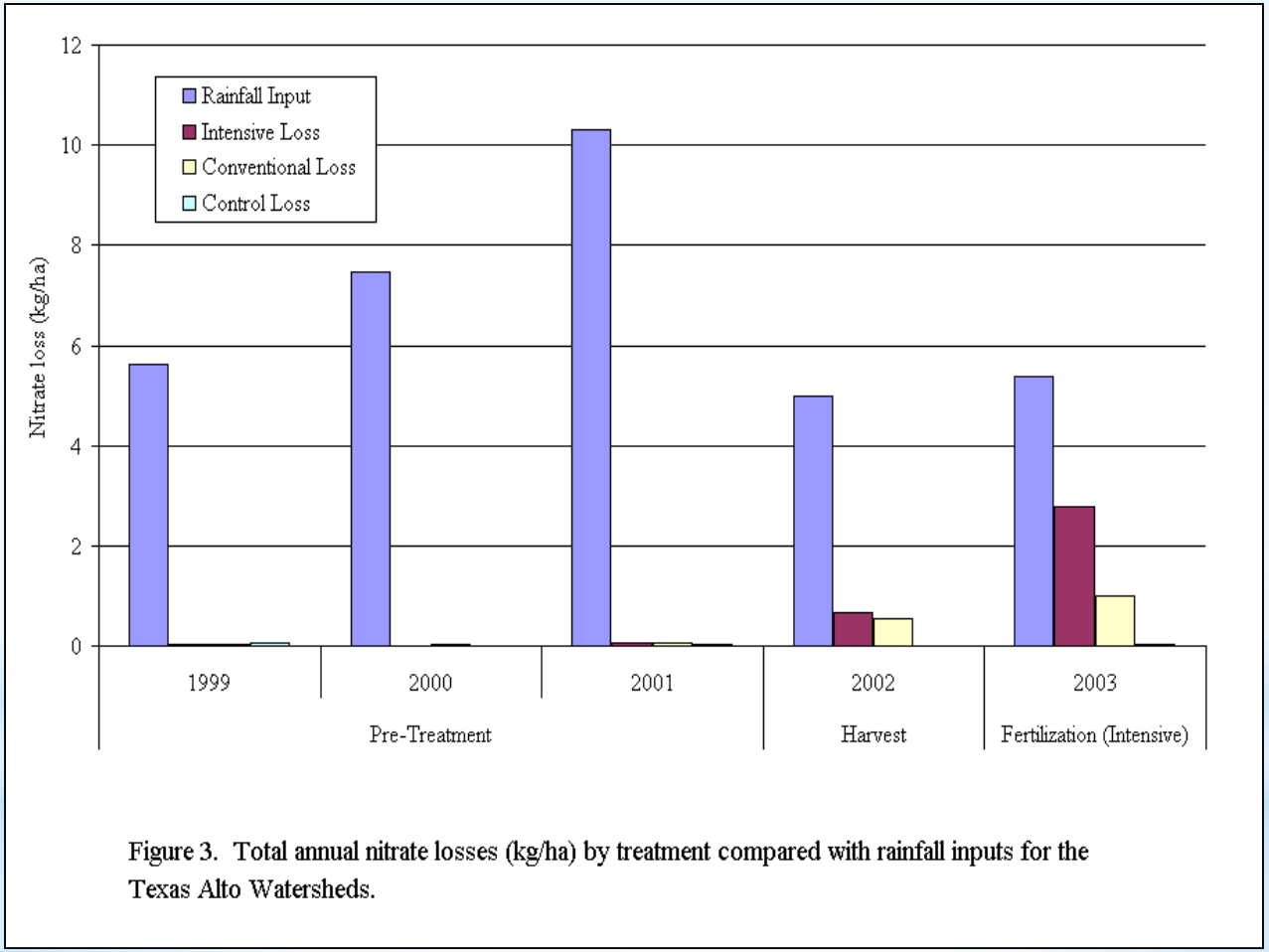
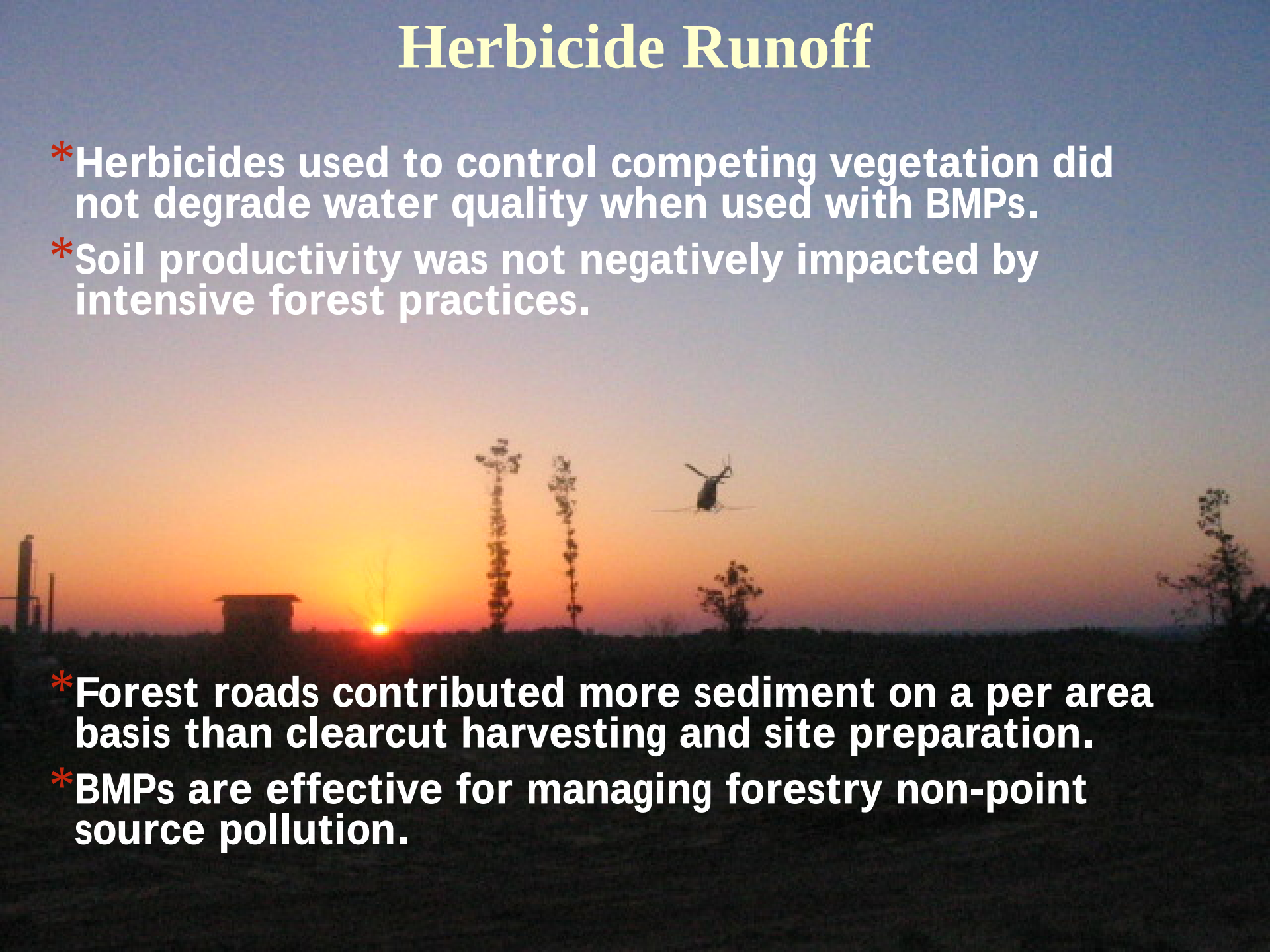


Figure 3. Total annual nitrate losses (kg/ha) by treatment compared with rainfall inputs for the Texas Alto Watersheds.

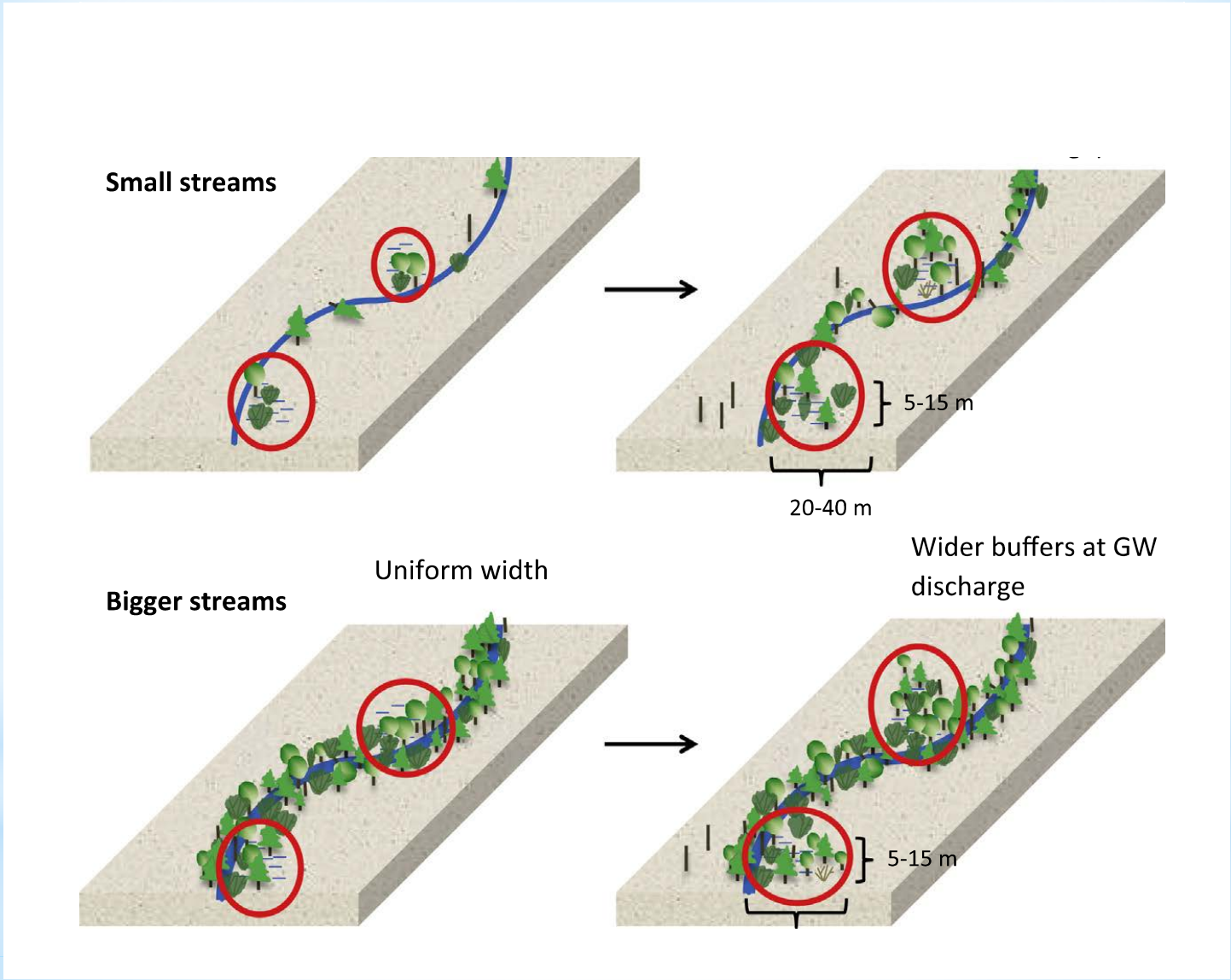
*Natural rainfall inputs were greater than the amount of nutrient losses.

Herbicide Runoff



- Herbicides used to control competing vegetation did not degrade water quality when used with BMPs.
- Soil productivity was not negatively impacted by intensive forest practices.
- Forest roads contributed more sediment on a per area basis than clearcut harvesting and site preparation.
- BMPs are effective for managing forestry non-point source pollution.

The Future of Forestry BMPs



Source: Kuglerova et al., 2014, Towards optimizing riparian buffer zones: Ecological and biogeochemical implications for forest management, Forest Ecology and Management, 334:74-84 http://dx.doi.org/10.1016/j.foreco.2014.08.033

The Future of Forestry BMPs

* More precise data on soils and water will allow for site-specific harvesting to minimize impacts to critical sensitive source areas and allow harvesting on areas less critical to water quality.

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Future of BMPs, Oil and Gas Development

*Integrating all land uses in watersheds.

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Oil and Gas Development

* Almost 14,000 kg/ha/yr of sediment moved from the well location placed in the intermittent stream channel.
* Less than 700 kg/ha/yr moved from the well location placed on the ridge top with a 15 m buffer between the edge of the location and the stream channel.

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* An accidental discharge of produced water resulted in mortality of riparian buffer trees in the discharge plume area.
* While oil and natural gas development can degrade surface water quality, appropriate conservation practices like retaining streamside buffers can mitigate the effects of these impacts.
* Industry wide BMPs would allow producers to self-police and self-report on environmental stewardship, like with the SFI and FSC programs in the timber industry.

Summary

- Forestry BMPs are an effective means for protecting water quality from silvicultural operations.
- Professional judgment is necessary to make the best site-specific prescription to protect water resources.
- Healthy forests are well managed forest.
- Healthy forests produce superior quality water.

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