

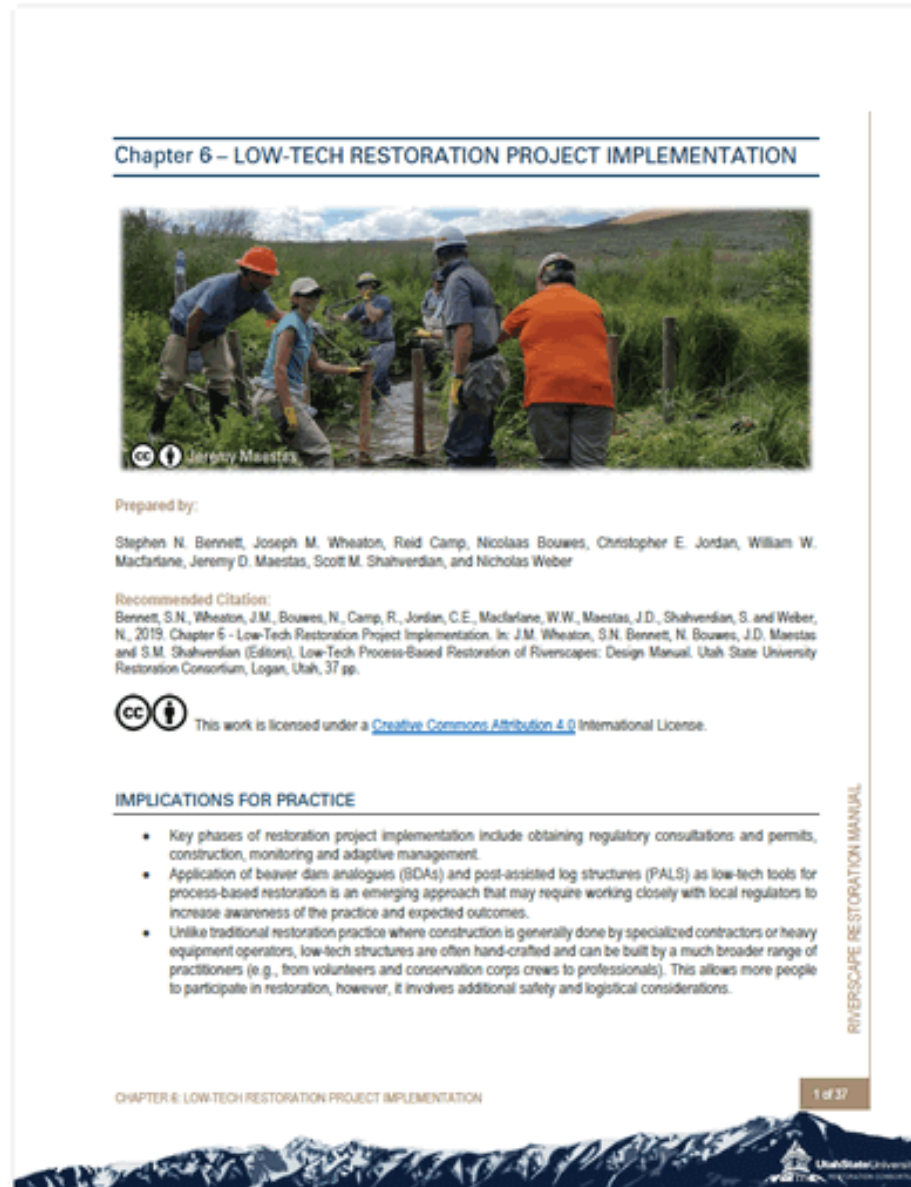
LTPBR WORKSHOP



IMPLEMENTATION: LOGISTICS, EQUIPMENT, AND SAFETY

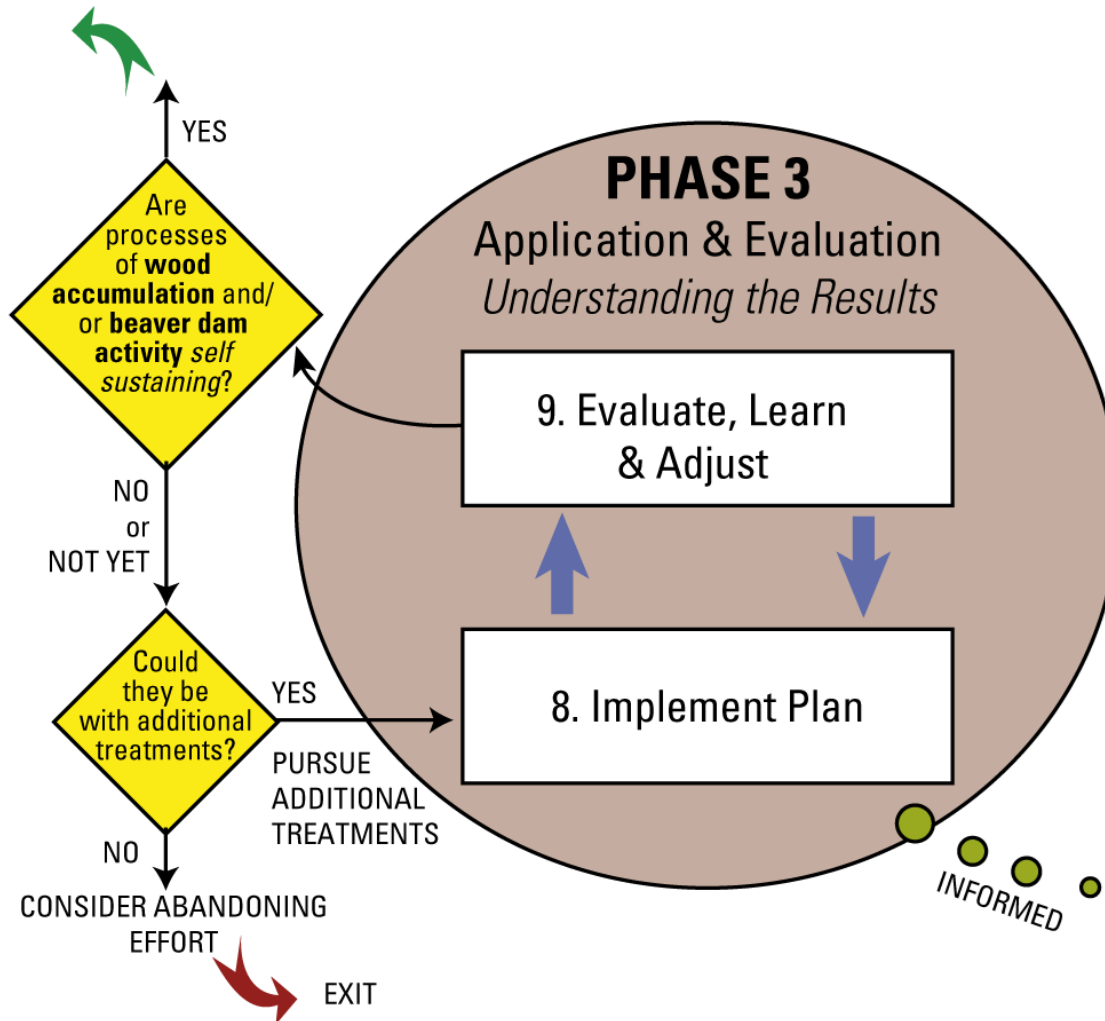


Design Manual References – Chapters 6



Phase 3 – Application & Evaluation

DONE.
SUCCESS!



- Treatments are continued until processes of wood accumulation and/or beaver dam activity are self-sustaining
- Exit strategy (via successfully self-sustaining) or realizing that was an unrealistic goal



Q: How many treatments, and how long will it take to become self-sustaining?



OUTLINE: Implementation



- I. Logistics
- II. Equipment
- III. Safety
- IV. Post-pounding

Logistics

Implementing LTPBR projects efficiently requires coordinating many moving parts

Characteristics of LTPBR Projects:

- Diverse workforce (land managers, volunteers, non-profits, consultants)
- Large spatial extents = many structures
- Remote and road-side settings

Logistic Considerations

- Workforce numbers and training needs
- Material availability
- Site access
- Seasonal closures (e.g. endangered species, fire)
- To post or not to post

Workforce Numbers and Training Needs

- LTPBR projects can engage and benefit from a diverse workforce
- Different groups and individuals may require different levels of training and oversight



Figure 6.10 in Chap 6: Bennett et al. (2019)

DOI: [10.13140/RG.2.2.25043.22567](https://doi.org/10.13140/RG.2.2.25043.22567)

Material Availability

- Is there an adequate source of woody material onsite?
- Can other upland restoration projects contribute woody material?



Figure 6.14 Chap 6 in Chap 6: Bennett et al. (2019)

DOI: [10.13140/RG.2.2.25043.22567](https://doi.org/10.13140/RG.2.2.25043.22567)

Material Availability

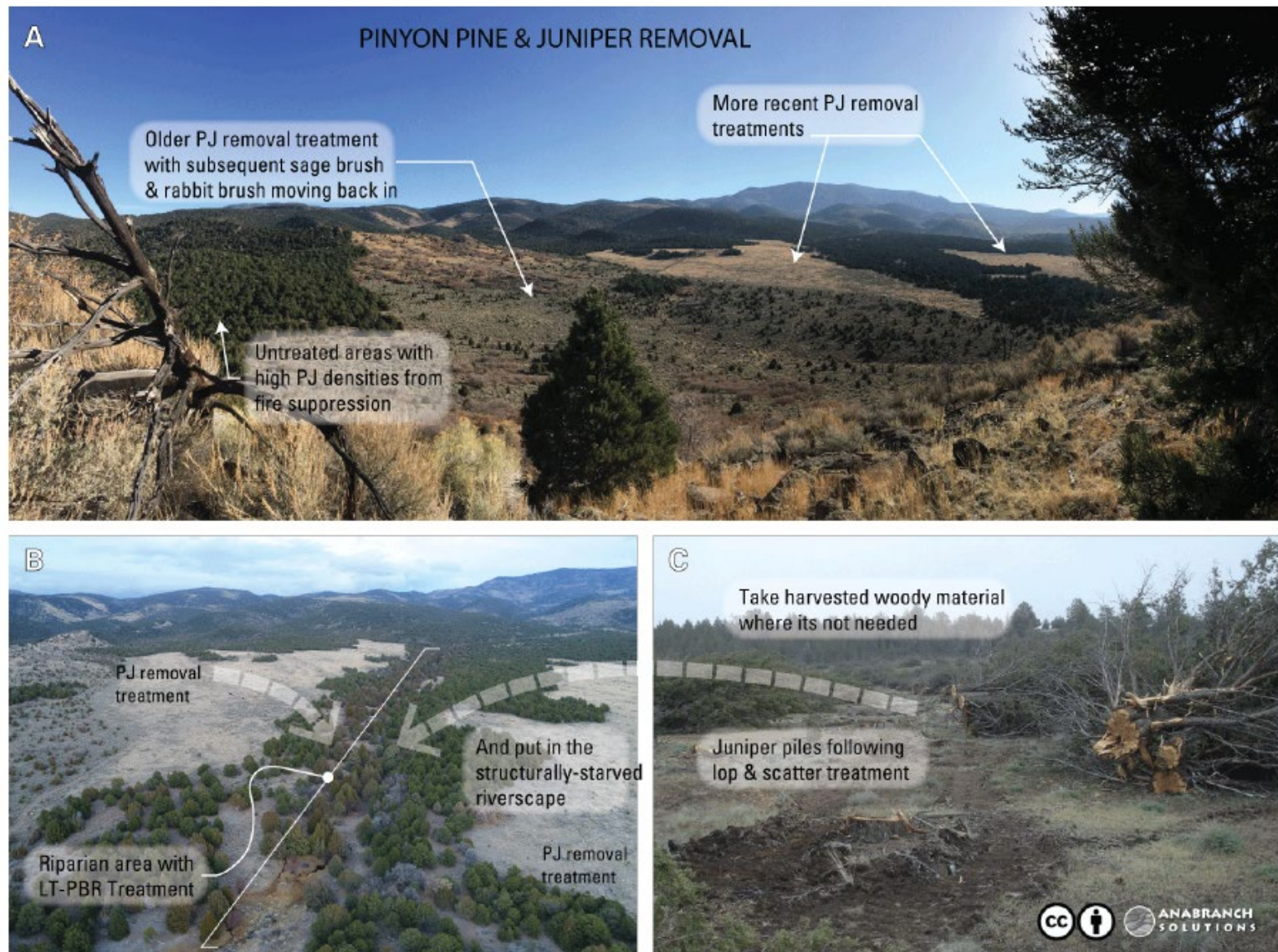


Figure 6.3 in Chap 6 of Chap 6: Bennett et al. (2019)

DOI: [10.13140/RG.2.2.25043.22567](https://doi.org/10.13140/RG.2.2.25043.22567)

Material Availability

Staging materials can make construction more efficient



Adapted from Figure 6.5 in Chap 6 in Bennett et al. (2019)

DOI: [10.13140/RG.2.2.25043.22567](https://doi.org/10.13140/RG.2.2.25043.22567)

Site Access

LTPBR approaches can be used in remote or road-side settings

Project Site Access

- 1.25 hrs paved road
- 1 hr dirt road
- 1 hr 4x4 road – no trailers
- 30 minutes ATV
- 30 minutes hike



Site Access

Roadside access for 5+ miles along three streams



Seasonal Closures

- Consult federal and state agencies for seasonal closures for instream or floodplain work

Examples

- June 1 – August 31 closure on Price River, UT for yellow-billed cuckoo (ESA listed species)
- July 15 – September 30 instream work window for southeast WA for ESA listed salmonids

Fire Season Restrictions

- Industrial Fire Precaution Level (IFPL)
- Impacts chainsaw use and hydraulic post-pounder

To Post or Not to Post

- Make sure posts are untreated
- Range of diameters
- Can be pre-sharpened or field sharpened
- Range of prices, depending on type (e.g. rough timber, peeler-cores)



Figure 6.4 in Chap 6 of Bennett et al. (2019)

DOI: [10.13140/RG.2.2.25043.22567](https://doi.org/10.13140/RG.2.2.25043.22567)

Pilot Projects

- Opportunity to address uncertainties (e.g. posts or post-less), and complex logistics
- More expensive per structure, but result in greater efficiency and cost saving during full implementation

Example: Grouse Creek Restoration

2016 Pilot Project: 20 structures in 3 creeks

2017: 120 structures in 3 creeks

OUTLINE: Implementation



I. Logistics

II. Equipment

III. Safety

IV. Post-pounding

Hand Tools

- Chainsaws
- Shovels
- Loppers
- Buckets
- Log Carriers
- Grip hoist
- Post-pounder



Figure 6.11 top and 6.12 (bottom) in Chap 6: Bennett et al. (2019)

DOI: [10.13140/RG.2.2.25043.22567](https://doi.org/10.13140/RG.2.2.25043.22567)

ATV/UTV

- ATV/UTVs can be used to efficiently transport materials on-site



Figure 6.13 in Chap 6: Bennett et al. (2019)

DOI: [10.13140/RG.2.2.25043.22567](https://doi.org/10.13140/RG.2.2.25043.22567)

Post-Driver Options

POST DRIVER OPTIONS

Sledge Hammer



Post Driver Manual Powered



Hand Operated Gas Powered



Hand Operated Hydraulic Powered



Tractor-Mounted Hydraulic Powered



Equipment Cost

\$

\$

\$\$

\$\$\$

\$\$\$\$

Operator Expertise

Unskilled

Unskilled

Moderate

Moderate

Skilled

Ease of Deployment

Easy

Easy

Easy

Moderate

Difficult

Max Diameter of Post

0.5 - 2"

0.5 to 2.5"

1" to 2.5"

1" to 4"

1" to 6"

Effectiveness / Scalability

Low

Low

Moderate

High

High (access limited)

Chapter 6 – Appendix A for more Info

Chapter 6 - APPENDICES

APPENDIX A – POST DRIVER INFORMATION



Brand Atlas Copco	Cost \$ 9000
Minimum Crew 2	Maximum Post Diameter 3.8
Driver Type Hydraulic	Power Supply Gas Generator
Weight lbs. 75	250
Example Model LPD-T HBP	LP-13-30 P

Application

Largest and most powerful system that has worked in most situations. Can be challenging to move in heavily vegetated or steep systems.

Comments

In larger streams a cheap plastic canoe (\$100) can be used to transport the system and posts downstream; Larger tires and handles can also be added to the power pac to make it easy to move/carry

URL <https://www.atlascopco.com/en-us>



Brand Skidril	Cost \$ 5000
Minimum Crew 2	Maximum Post Diameter 4
Driver Type Hydraulic	Power Supply Gas Generator
Weight lbs. 70	100
Example Model HP 20	P38

Application

Will drive most posts in most situations except in difficult situations such as large embedded cobble and hard clay

Comments

In larger streams a cheap plastic canoe (\$100) can be used to transport the system and posts downstream; Larger tires and handles can also be added to the power pac to make it easy to move/carry

URL <http://skidril.com>



Figure 22 – Fact sheet produced by Nick Weber at Anabran Solutions on Portable Power Packs and drivers (combined these are hydraulic post drivers). We are not endorsing any specific brand or manufacturers, but provide these for informational purposes only-as these are readily available and have been used extensively in low-tech restoration.



Brand Rhino	Cost \$ 2000
Minimum Crew 1	Maximum Post Diameter 4 - 6
Driver Type Pneumatic	Power Supply Compressor
Weight lbs. 50 - 100	None
Example Model PD 55	None

Application

Pneumatic units require air compressor

Comments

We have not used these but could be useful in some situations such as with larger posts in easy access situations.

URL <https://www.airpostdrivers.com/air-post-driver-parts.htm>



Brand Redi	Cost \$ 1500 - 2500
Minimum Crew 1	Maximum Post Diameter 3
Driver Type Gas	Power Supply Gas Engine
Weight lbs. 40	None
Example Model Redi Classic	None

Application

Good for small projects in relatively easy situations; very portable but does NOT have the power for difficult sites or driving hundreds of post/day

Comments

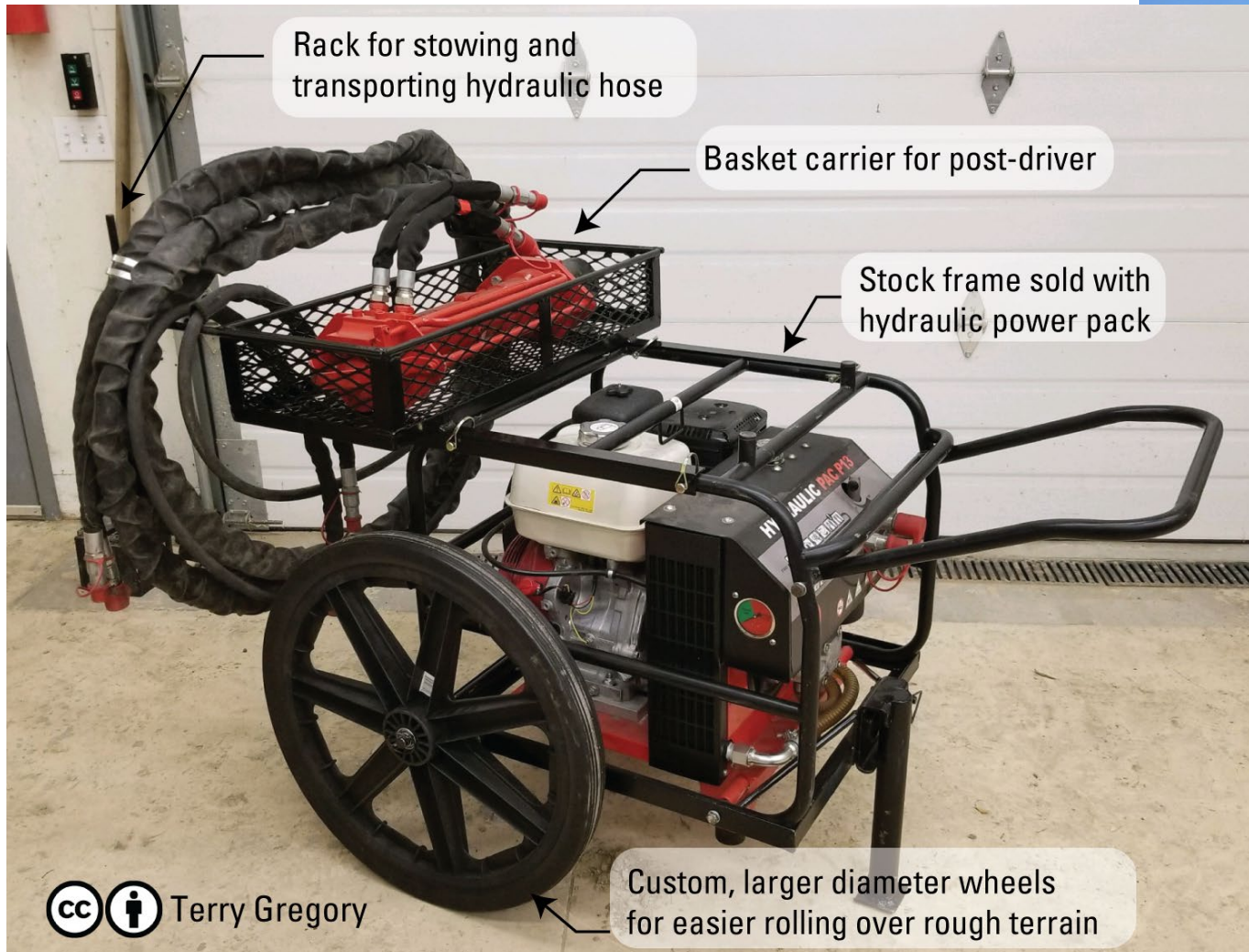
Handy for T-posts and maintenance of structures.

URL <https://redidriver.com/all-about-redi-driver-inc/>



Figure 23 – Some pneumatic and gas-powered alternative to hydraulic post drivers (Fact sheet by Nick Weber of Anabran Solutions). We are not endorsing any specific brand or manufacturers, but provide these for informational purposes only as these are readily available and have been used in low-tech restoration extensively.

Practical custom modifications to a 200+ lb. power pack = SAFETY (saving your back)



Small wheels
come standard =
doesn't roll well
in a riverscape

Instream Equipment Transportation

- Canoe/boat to move post-pounder and materials in areas with dense vegetation



Adapted from Figure 6.15 in Chap 6: Bennett et al. (2019)

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OUTLINE: Implementation



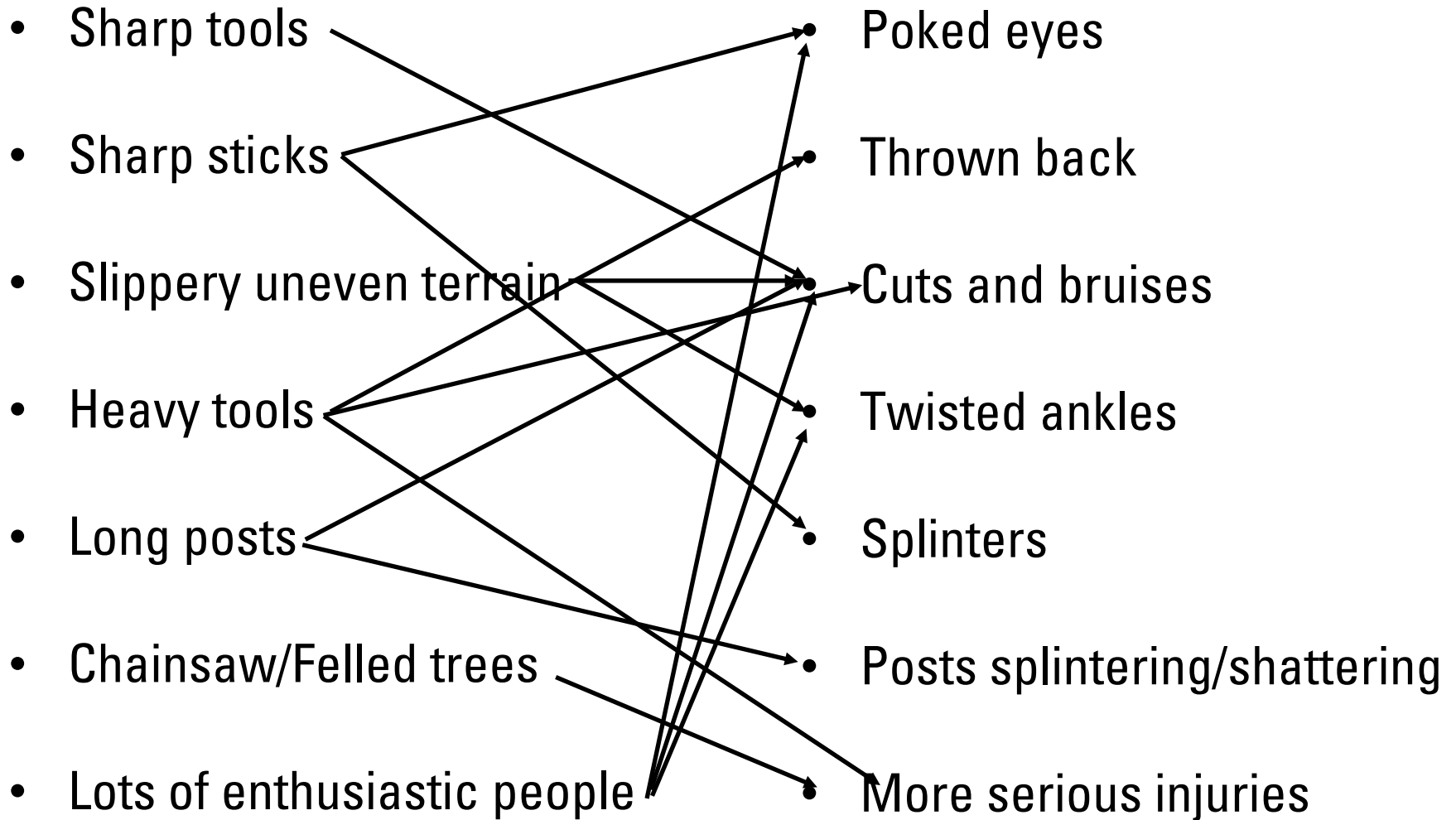
- I. Logistics
- II. Equipment
- III. Safety
- IV. Post-pounding

Safety – What's Wrong Here?



Building LTPBR structures is construction work

Construction Hazards and Common Injuries



Safety

- Communication: regular safety meetings, designated safety lead
- Appropriate training
- Environmental hazards
- Construction Hazards
- Personal Protective Equipment (PPE)



KNOW YOUR PPE

protective
helmet



high
visibility
clothing



protective
gloves



safety
footwear



PERSONAL PROTECTIVE EQUIPMENT

Safety: Communication

- Different organizations/agencies have different safety communication strategies (e.g. Job hazard analysis, tailgate safety session, morning safety briefing etc.)
- Schedule a regular time to communicate safety concerns based on the work site, planned activities, and environmental conditions



Safety: Appropriate Training

- Some activities and tools require specific training and/or certification:
 - Chainsaw operation
 - Driving ATV/UTVs
 - Grip hoist operation
 - Post-pounder operation



Safety: Environmental Hazards

- 'Neither snow nor rain nor heat...' (USPS unofficial motto)
- Environmental hazards: rain, sun, heat, cold, snow all impact individual and group safety needs



Safety: Construction Hazards

- Uneven, slippery ground
- Innumerable sharp sticks and objects
- Heavy equipment
- Larry, Curly, and Moe (i.e. your co-workers)



Safety: Personal Protective Equipment (PPE)

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Personal Protective Equipment



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Overview

What is personal protective equipment?

Personal protective equipment, commonly referred to as "PPE", is equipment worn to minimize exposure to hazards that cause serious workplace injuries and illnesses. These injuries and illnesses may result from contact with chemical, radiological, physical, electrical, mechanical, or other workplace hazards. Personal protective equipment may include items such as gloves, safety glasses and shoes, earplugs or muffs, hard hats, respirators, or coveralls, vests and full body suits.

What can be done to ensure proper use of personal protective equipment?

All personal protective equipment should be safely designed and constructed, and should be maintained in a clean and reliable fashion. It should fit comfortably, encouraging worker use. If the personal protective equipment does not fit properly, it can make the difference

Personal Protective Equipment



OUTLINE: Implementation



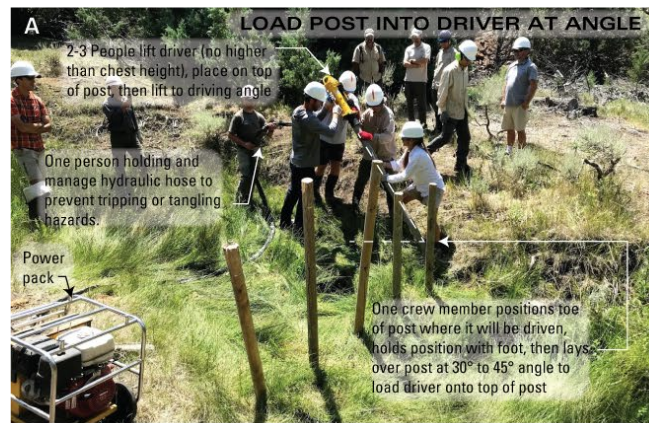
- I. Logistics
- II. Equipment
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Post-Pounding

How many people does it take to pound a post *safely*?

Context:

- Driver is 80-100 lbs
- Hose is 40-50 lbs.
- Powerpack is 200+ lbs.

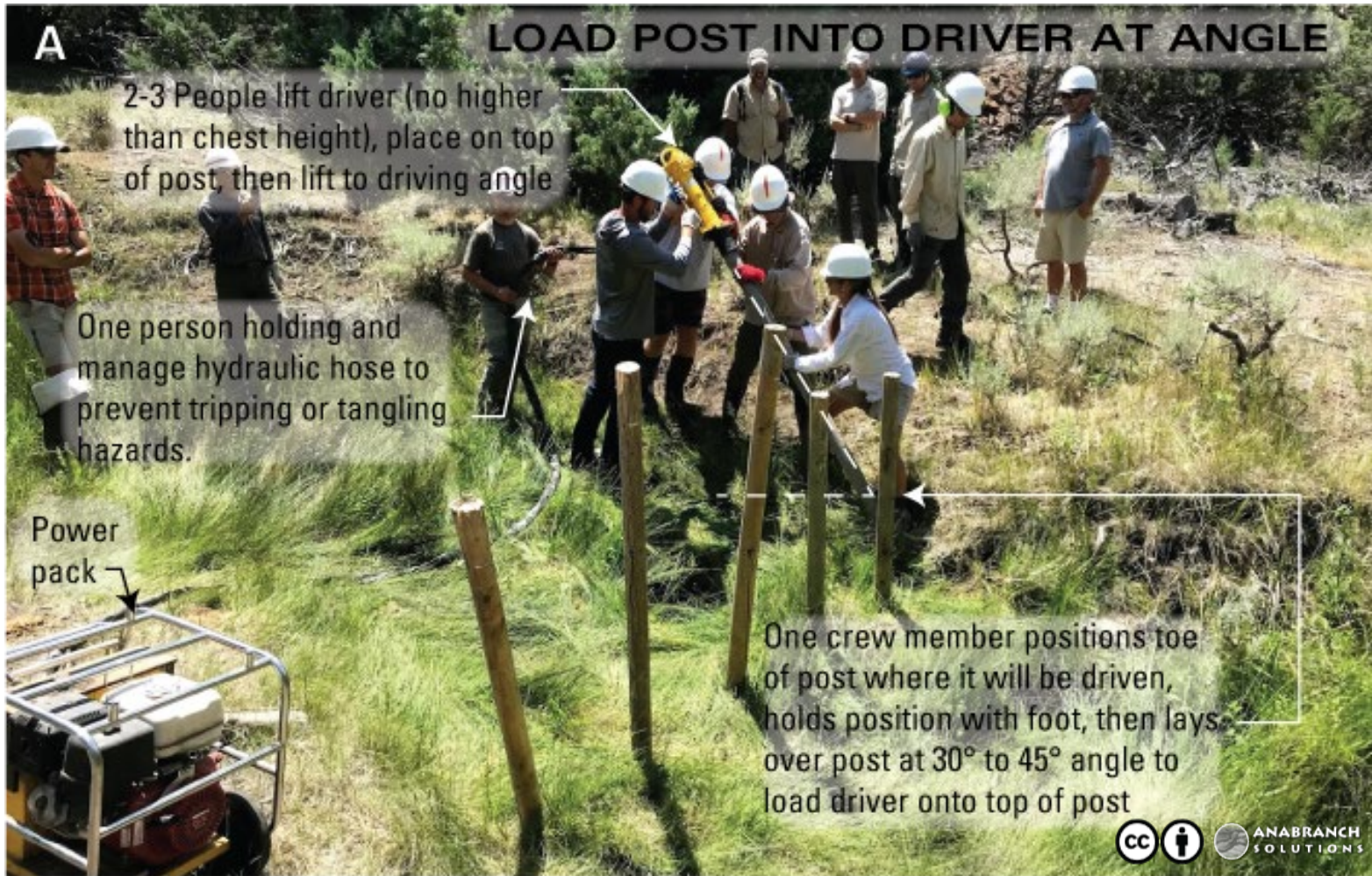


Adapted from Figure 6.20 in Chap 6: Bennett et al. (2019)

DOI: [10.13140/RG.2.2.25043.22567](https://doi.org/10.13140/RG.2.2.25043.22567)

Post-Pounding

Angle post to place (80 lbs) post driver on top of post



Adapted from Figure 6.20 in Chap 6: Bennett et al. (2019)

DOI: [10.13140/RG.2.2.25043.22567](https://doi.org/10.13140/RG.2.2.25043.22567)

Post-Pounding

2 to 4 people driving post into bed (note can be vertical or angled)



Adapted from Figure 6.20 in Chap 6: Bennett et al. (2019)

DOI: [10.13140/RG.2.2.25043.22567](https://doi.org/10.13140/RG.2.2.25043.22567)

SUMMARY: Implementation



- Effectively managing logistics can significantly increase restoration footprint of LTPBR projects
- Relies on hand-tools and manual labor
- Requires appropriate safety training and equipment