



SCA MASSACHUSETTS AMERICORPS  
**SUSTAINABLE BRIDGE  
DESIGN AND  
CONSTRUCTION**



*department of*  
Conservation and Recreation

dcr



**James Sims**  
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Conservation Service  
Coordinator

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*Needham, 2015*

# SCA Massachusetts AmeriCorps

*Entering our 19<sup>th</sup> year!*

- **SCA – Nation’s oldest and largest youth conservation organization since 1957**
- **SCA Massachusetts is a 10-month residential AmeriCorps program in partnership with DCR and the Massachusetts Service Alliance**
- **26 volunteer corps members age 18-25, based at Kenneth Dubuque State Forest in Hawley, Massachusetts**
- **Members teach environmental education in local schools in the winter**
- **Members complete conservation service projects on public lands in the spring and summer**



# LEGACY AND MISSION



- **Modeled after the Civilian Conservation Corps**
- **Provide valuable conservation service to lands and communities**
- **Provide professional development opportunities for our members**
- **We are not contractors, engineers, or professional carpenters**



# MEMBER TRAINING



Carpentry



Chainsaw



# MEMBER TRAINING



Rigging



General Trailwork



# WHY PARTNERS HIRE US



*Freetown Fall River SF, 2015*

- **We provide simple, effective solutions**
- **We pack light and fast – can work in remote locations with traditional and lightweight tools**
- **Members are highly motivated and enthusiastic**
- **We care about our relationships**



# WHEN DO WE BUILD BRIDGES?



# CONSIDERATIONS FOR TRAIL BRIDGES

## Our Partners Want...

- **Safe**
- **User-group appropriate**
- **Long-lasting**
- **Protects the Resource**
- **Cost-effective**

## Trail Users Want...

- **Safe**
- **Accessible**
- **Minimal “disturbance” – visual and experiential**
- **Protects the Resource**

*Almost the same*



# TYPES OF BRIDGES



*Whitcomb Woods, 2014*

**Dimensional**



*Franklin Land Trust, 2015*

**Native**



*Kenneth Dubuque SF, 2012*

**Hybrid**



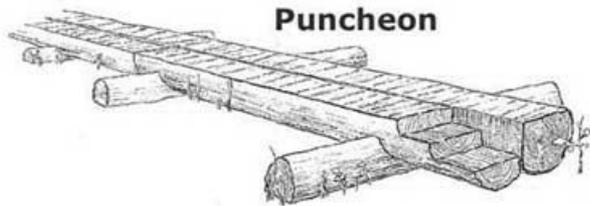
# NATIVE TIMBER



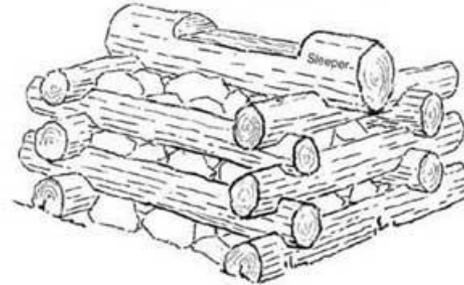
- **Members fell trees on-site**
- **Transport by hand**
- **Use of spruce, hemlock, or fir – usually hemlock due to availability and rot resistance**
- **Little to no cost outside of crew**



# NATIVE TIMBER



**Single sleeper on log cribbing**



# NATIVE TIMBER



*Franklin Land Trust, 2015*

- **Previously our most often constructed bridge**
- **Limited user group**
- **Longevity = not quite as long as pressure-treated materials**
- **Best used in backcountry setting**



# DIMENSIONAL



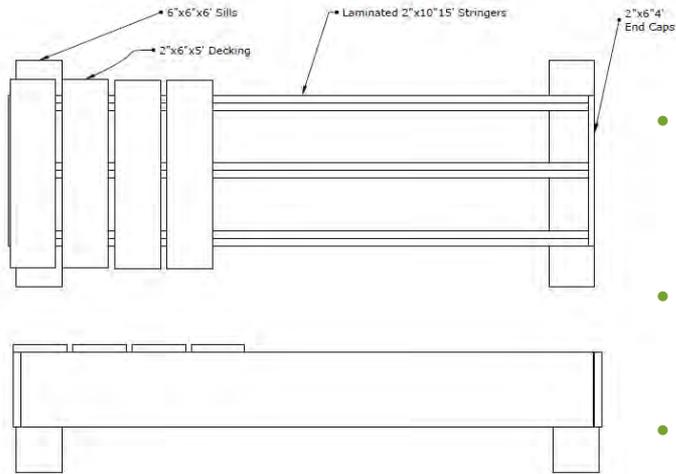
*Needham, 2015*



*Clarksburg SF, 2015*



# DIMENSIONAL



- **Extremely versatile designs**
- **Easily made accessible to all users**
- **PT lumber lasts**
- **No felling – but must transport materials**
- **Best used in front-country setting**



*Quinobequin, 2015*



# DIMENSIONAL



*Mahican-Mohawk Trail, 2015*

- **As simple or complex as needed**
- **Almost always pressure-treated (unless restricted by conservation commission)**
- **Can prefabricate, carry-in, and assemble, OR**
- **Treated sawdust and chips can be captured**



# OPTIONS WITH DIMENSIONAL



Piles



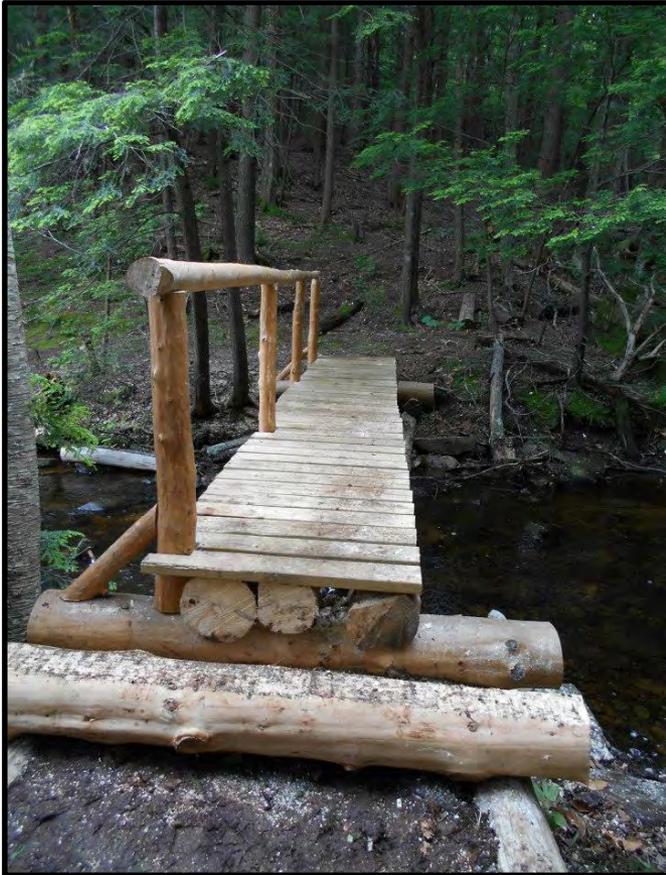
Handrails



Puncheon



# HYBRID



- **Compromise in terms of cost, materials transportation, and time**
- **Whole logs provide great strength when center supports can't be used**
- **Decking allows diverse users to enjoy the trail**
- **Accessible ramps become a possibility**
- **Retains a rustic, low-impact appearance**



# CHALLENGES

- **Volunteers aren't experts**
- **Environmental factors**
- **Time**
- **Permitting Restrictions**
- **Materials and special equipment**



# MEETING CHALLENGES

- **Numbers + Enthusiasm**
- **Staff Support**
- **Flexibility/Adaptability --  
“Optimism and Grit”**
- **Creative Scheduling**
- **Choosing appropriate Projects**
- **Technology**



# PROBLEM-SOLVING

- ~10 foot crossing of muddy stream
- Conservation Commission restrictions: nothing within 12' of stream
- Span must be ~35 feet
- 30 minute hike in – no road
- At least two 24”-26” diameter hemlock logs
- GripHoist rigging system breaks



# PROBLEM-SOLVING



Moving logs by hand



# PROBLEM-SOLVING



Using GripHoist System



# PROBLEM-SOLVING



Using ropes and pulleys



# PROBLEM-SOLVING



Single Stringer Set



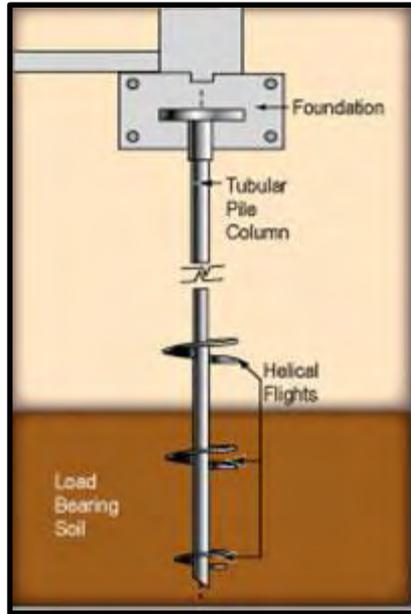
# PROBLEM-SOLVING



Second Stringer and Decking



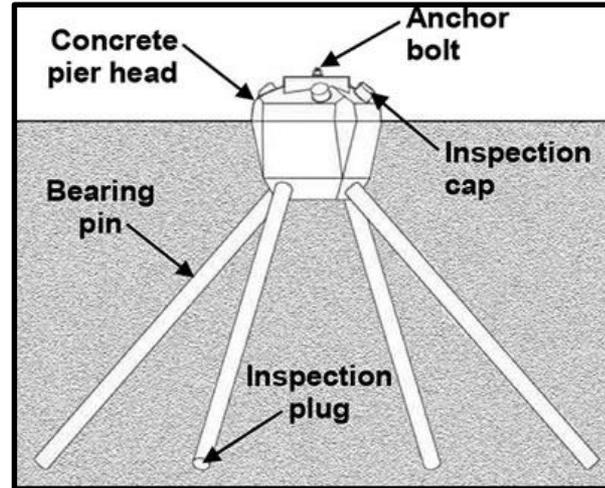
# TECHNOLOGY



Helical Piers



# TECHNOLOGY



Diamond Piers



# TECHNOLOGY



Town of Needham, 2015

Diamond Piers



# ON THE HORIZON

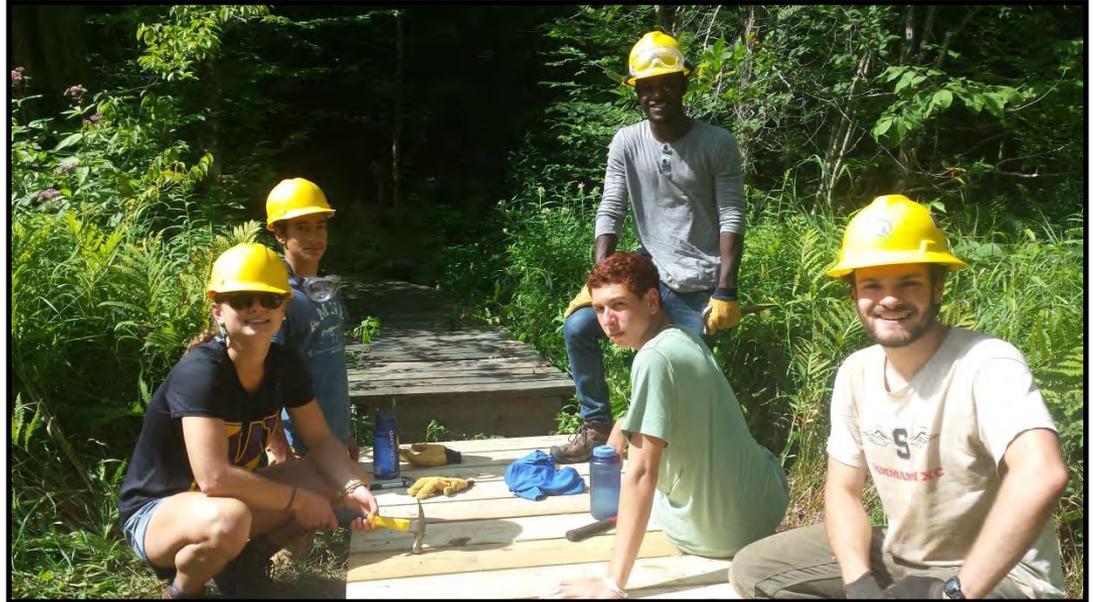
- **Bridges spanning up to 50 feet**
- **Adirondack Corps use telephone poles – up to six poles**
- **Weight limit = ??**
- **Treated poles can last 25 years+**
- **Materials are brought in by helicopter**



*SCA Adirondacks, 2015*



# QUESTIONS?





**Student Conservation Association  
Massachusetts AmeriCorps**

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