

NSS Vertical Training Commission:
Developing a National
Vertical Training Program
for US Cavers



Ron Miller, Hazel Barton,
and Jenny Tison

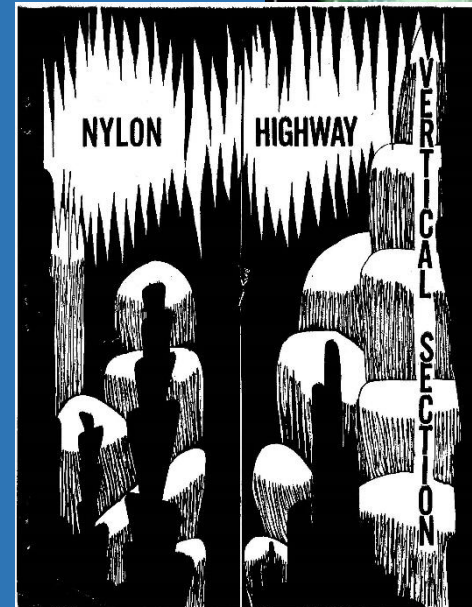
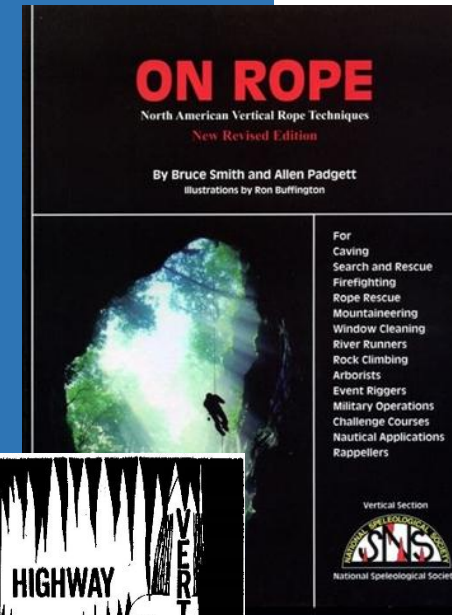
June 2022

NSS Vertical Training History

- Vertical Section Nylon Highway (1974 -)
- On Rope (1987 and 1996)
- VS vertical training materials
- VS vertical techniques workshops (NSS conventions)
- Grotto vertical training programs



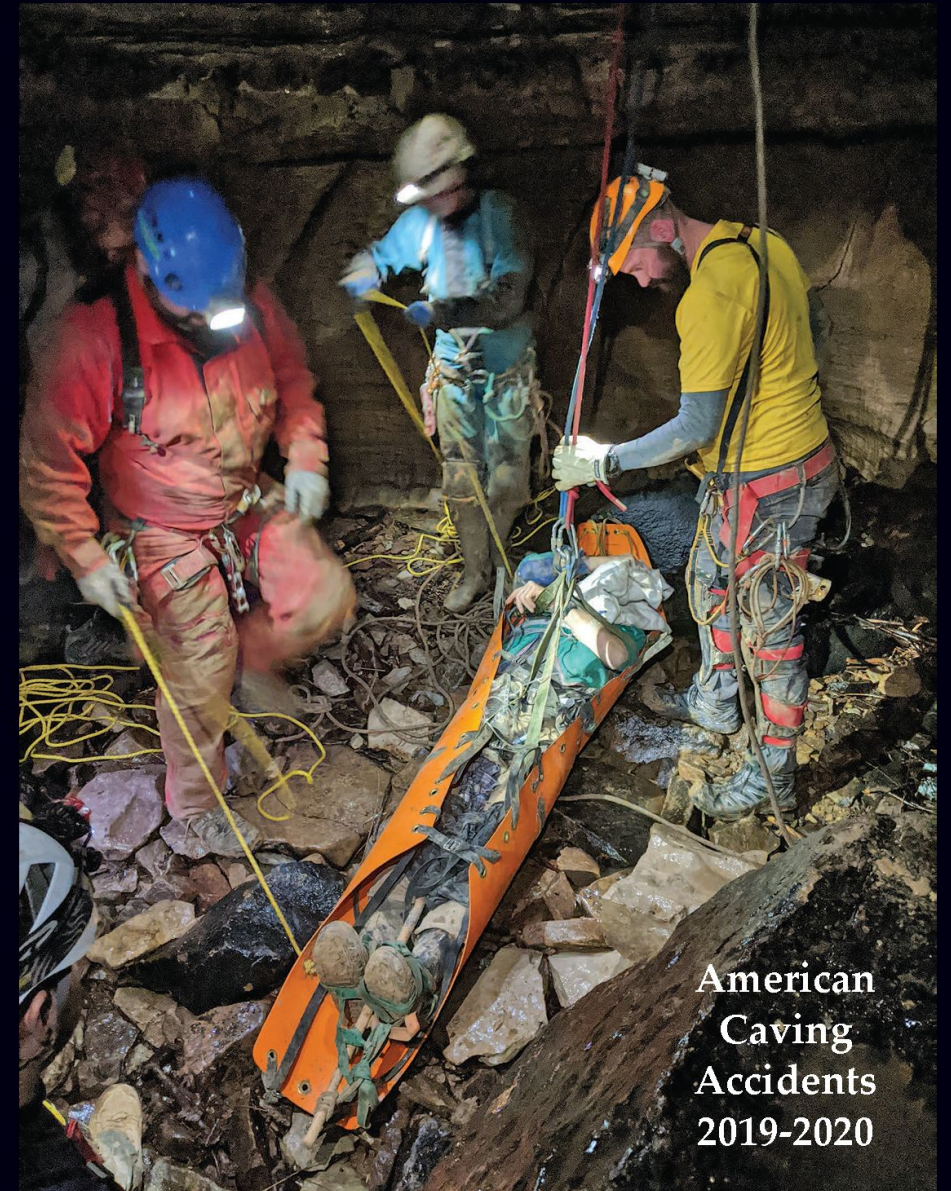
Vertical Training
Student Manual



Motivation

- Caver concerns - lack of consistency in vertical techniques and safety among US cavers
- Recent caving accidents related to vertical training issues
- In 2019-2020:
 - 16 reported vertical caving accidents
 - 10 vertical training related
 - 2 fatalities, both vertical training related

NSS NEWS June 2021



American
Caving
Accidents
2019-2020

How did VTC get formed?

- Ad hoc committee on vertical education (April 2021)
 - Survey of vertical training preferences
 - Enthusiasm for national training program
 - No accepted teaching standards
 - Recommended new NSS commission
- Vertical training transition committee (Aug 2021)
 - Drafted VTC charter & posted online
 - Held online townhall and solicited written comments (87 comments)
- Charter approved (Dec 2021)

The NSS Vertical Training Commission

Recommendations of the *ad hoc* Committee on Vertical Education
July 26, 2021

Following the concerns of NSS members over a lack of consistency in techniques and safety in vertical caving in the US, the NSS President Geary Schindel, along with Administrative Vice President, Adam Weaver, created an *ad hoc* committee to make recommendations to the NSS BOG on how the NSS could address these issues. Hazel Barton, as Chair of the NSS Safety and Techniques Committee, was appointed chair of this committee. In April 2021 Hazel assembled a committee consisting of 11 cavers with diverse backgrounds in vertical training, rigging, NCRC experience, membership in the VPI Cave Club, and various regional affiliations. The NSS President and AVP were *ex officio* appointees to the committee. The 13-person membership roster is attached (Appendix A).

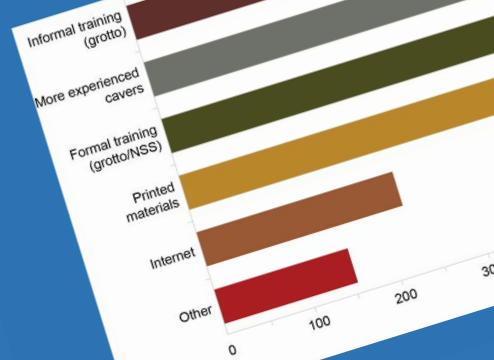
The *ad hoc* committee met routinely from May 17 through July 12, 2021, to discuss whether the NSS should become formally involved in vertical training in the US, and if so, what training structure should be used.

Many of the discussions were centered around the findings of the recent Vertical Training Preferences (VTP) survey, along with the personal experience of the committee members. During extended discussions (see attached Appendices B – F), the committee felt that the current structure of vertical training in the US is not sufficiently effective, with an apparent deficit in the quality and quantity of instruction, and with no clearly defined competencies or standards for education. The result has been a patchwork of training, with the reports in American Caving Accidents (ACA) indicating that insufficient or inappropriate training may have contributed to numerous accidents and even fatalities over the past few years.

While the NSS Vertical Section (VS) has generated training materials for vertical caving, there are a number of issues with these materials in that: 1) they have not been updated in years; 2) they are not well known within the caving community; and 3) there is no mechanism for evaluating the competency of the trainers themselves. The VTP survey also indicated that there was a disparity between American cavers and their international counterparts on expeditions, where inconsistency and proficiency gaps in vertical techniques became apparent. There was also a strong concern by respondents that many of the people teaching vertical are insufficiently skilled in the art to train others to cave safely.

Despite these considerations, there are examples of vertical training programs such as the VPI Cave Club model, which has successfully trained generations. There are also example organizations such as the National Cave Rescue Commission (NCRC) and Cave Research Federation (CRF) that provide training of advanced caving techniques. The committee believes that the NSS BOG should consider a new structure, however, to meet the needs of the caving community.

Q: How did you learn vertical?



Charter of the National Speleological Society Vertical Training Commission

Adopted by the Board of Governors on December 4, 2021

Our trainers recognize that the best teachers are always learning from their students and will use the best practices in education for effective training. Our goal is to improve vertical safety for cavers, while resisting efforts to develop vertical training certifications as a mechanism to limit or restrict cave access.

I) ESTABLISHMENT: The National Speleological Society (NSS) hereby establishes the Vertical Training Commission (VTC or Commission). The VTC is located within the Education Division of the Department of the NSS Administrative Vice President (NSS AVP).

II) CHARGE: The charge of the VTC is to:

A) Create a training curriculum to help interested individuals obtain the appropriate and sufficient competencies, critical thinking, and problem-solving skills needed to be safe while using vertical caving techniques.

B) Develop and maintain a vertical training program that provides hands-on experience and training through vertical training courses ("Courses") that are accessible, attainable, and understandable to people of diverse knowledge sets and backgrounds, while maintaining minimal costs and bureaucratic processes.

C) Train competent, safe, and active vertical trainers to be proficient in teaching the VTC educational materials.

III) STRUCTURE: The VTC will be composed of a National Coordinator, a Secretary Treasurer, Education Coordinator, Regional Coordinators (RCs), Master-Trainers and Trainers. A Governing Board (Board) will be responsible for managing the overall affairs of the organization, and will coordinate and oversee training operations, including qualification of Master-Trainers and Trainers. The Commission will initially have one standing committee, the Curriculum Committee (CC), which will be responsible for developing and maintaining educational materials for use in

VTC's Charge (from Charter)

1. Create a training curriculum to help interested individuals obtain the appropriate and sufficient competencies, critical thinking, and problem-solving skills needed to be safe while using vertical caving techniques.

UNEXPECTED VERTICAL OBSTACLES

GENERAL

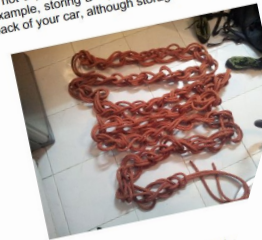
Bees:

- Texas landscaper killed by swarm of bees while suspended from tree
- A large pit in Mexico which had ably Africanized bee colonies. We rigged, climbed and descended, but didn't disturb them. Even if they were well over 100' from the hive.

should never be used to cut objects such as gloves, hair, or clothes, free from a...
It's also why more experienced cavers tend to be overly judgmental when the...
standing on a rope; when coiled at the bottom of a pit, standing on a rope has...
its strength, other than maybe driving some dirt into the core, but stepping o...
the top of a pitch could be catastrophic.

Heat: While descending devices can get hot, the heat transfer is general...
of the rope where it melts and glazes the sheath surface but does not...
strength. Nonetheless, care should be taken to make sure that a rope is n...
heated above its softening temperature (150°C), such as leaving it r...
hot day, and any observable melting should indicate that a rope is n...

Sunlight: The nylon polymer is sensitive to breakdown by UV, b...
is not a problem in caves or during travel, it is worth keeping...
example, storing a rope in your basement or in a closet is n...
back of your car, although storage directly on concrete shou...

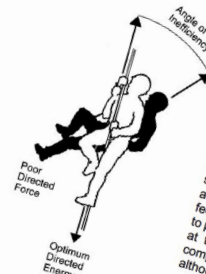


Placeholders from internet - need r

Chemicals: Nylon is reasonably...
cause damage in obvious and r...
batteries used in caving lights...
is still such a risk from car b...
fibers even when not in dir...
strong acids, bleach, h...
dramatically reduce stre...

Regular laundry deter...
dirt that gets ground...
accepted method r...
loosely coil in a d...
loading machin...
machine and r...
wet or dry, b...

...device...
...of the night my sole partner got a cramp and...
...not pit. God knows why...
...with two



Efficiency - Most of the energy used for the climb should come...
from your quadriceps - your arms are not nearly as strong as...
your legs, and you can quickly tire yourself out if you are relying...
on them too much. Nonetheless, all the climbing systems...
require some upper body strength and form becomes really...
important to make sure you don't tire yourself out.

Good form involves thinking about where you should be...
directing force. The goal is to push yourself directly up the rope...
and any force out away from pushing down on the rope is...
wasted effort. For the upright systems, this is relatively...
straightforward, although leaning back can cause your legs to...
feet is important. With sit-stand systems, there is a tendency...
to push outwards with your legs, given that you are sitting down...
at the end of a cycle. To correct this, people sometimes...
compensate by pulling upwards, which can tire the arms...
although a foot ascender can help to keep you vertical.

6-1. Properly directing the climbing...
force can result in minimum wasted...
effort. The angle of inefficiency...
should be as close to zero as...
possible.

In all cases, the more upright you are, the more the quadriceps...
will be doing the work of pushing you up. With climbing...
systems, it is also more efficient to take more, smaller steps...
(similar to the motion of walking up stairs) than deep lunges...
as if you were trying to stand up on a chair, as this involves a...
lot more arm strength to pull. In the case of sit-stand systems...
the key is to find the right height to lift the legs that you can...
repeat over and over again - deep squats require a lot more...
effort that standing up from a chair. In all cases, a cadence that...
allows you to climb consistently without getting out of breath is ideal, but without such small steps...
important that your equipment is fitted correctly to your body.

Fitting - To get the most out of your climbing system and reduce wasted effort, your ascending...
system needs to be tuned to your body shape (the length of your arms and legs). The first time a...
lot of people try vertical, they borrow equipment and get really frustrated that they can't climb -...
this usually has nothing to do with you, or your technique. You are using equipment when the...
foot loops and ascenders are tuned for someone taller (your steps are too short) or shorter (your...
steps are deep and exhausting). Ill-fitting equipment is perhaps the biggest reason that people...
become exhausted and get into trouble when climbing. We provide some simple instructions on...
how to do this, but the best way is to have someone experienced in the climbing system you...
choose to help you adjust it and show you how the different lengths can effect the amount of...
energy you need to expend to climb.

RECOGNIZE THE APPROPRIATE EQUIPMENT FOR USE IN VERTICAL CAVING

There is a lot of equipment that is sold for climbing and organizations that certify equipment...
testing it to make sure it is safe enough to endure the shock-loading and wear the could expected...
to be encountered during use (as vertical caving is considered a form of climbing, the equipment...
is certified by these same organizations). These organizations are the Union Internationale des...
Associations d'Alpinisme (UIAA), Comité Européen (CE) and European Standards or

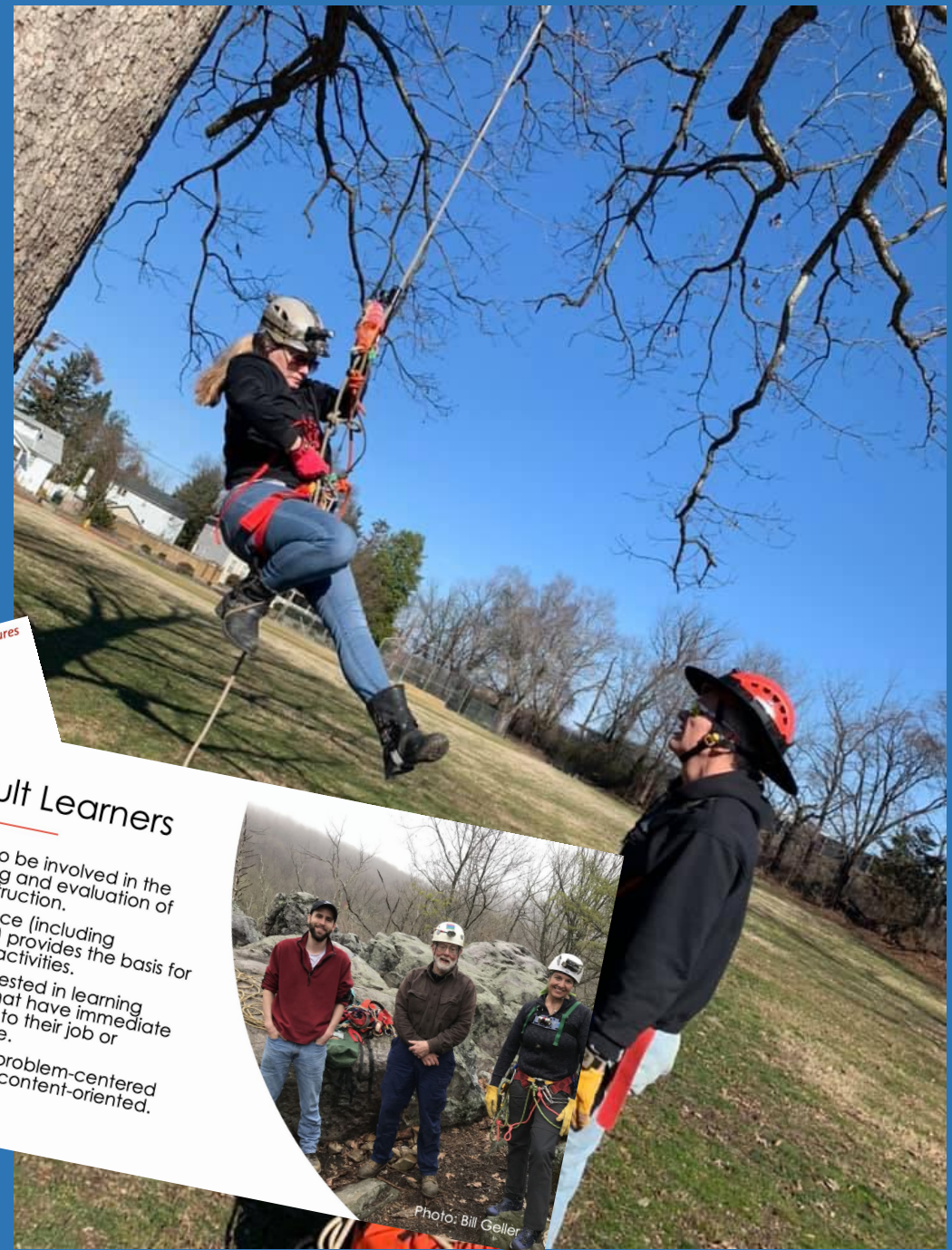
VTC's Charge (from Charter)

2. Develop and maintain a vertical training program that provides hands-on experience and training through vertical training courses that are accessible, attainable, and understandable to people of diverse knowledge sets and backgrounds, while maintaining minimal costs and bureaucratic processes.



VTC's Charge (from Charter)

3. Train competent, safe, and active vertical trainers to be proficient in teaching VTC educational materials.



Personality features

Students Domain Knowledge

- Novices more likely to use knowledge to generate conclusions and operate reinforce problems.
- Such misconception barriers to learning:
 - naïve concepts
 - ritual concept
 - Gordian cor

Adult Learners

- Need to be involved in the planning and evaluation of their instruction.
- Experience (including mistakes) provides the basis for learning activities.
- Most interested in learning subjects that have immediate relevance to their job or personal life.
- Learning is problem-centered rather than content-oriented.

Photo: Bill Geller

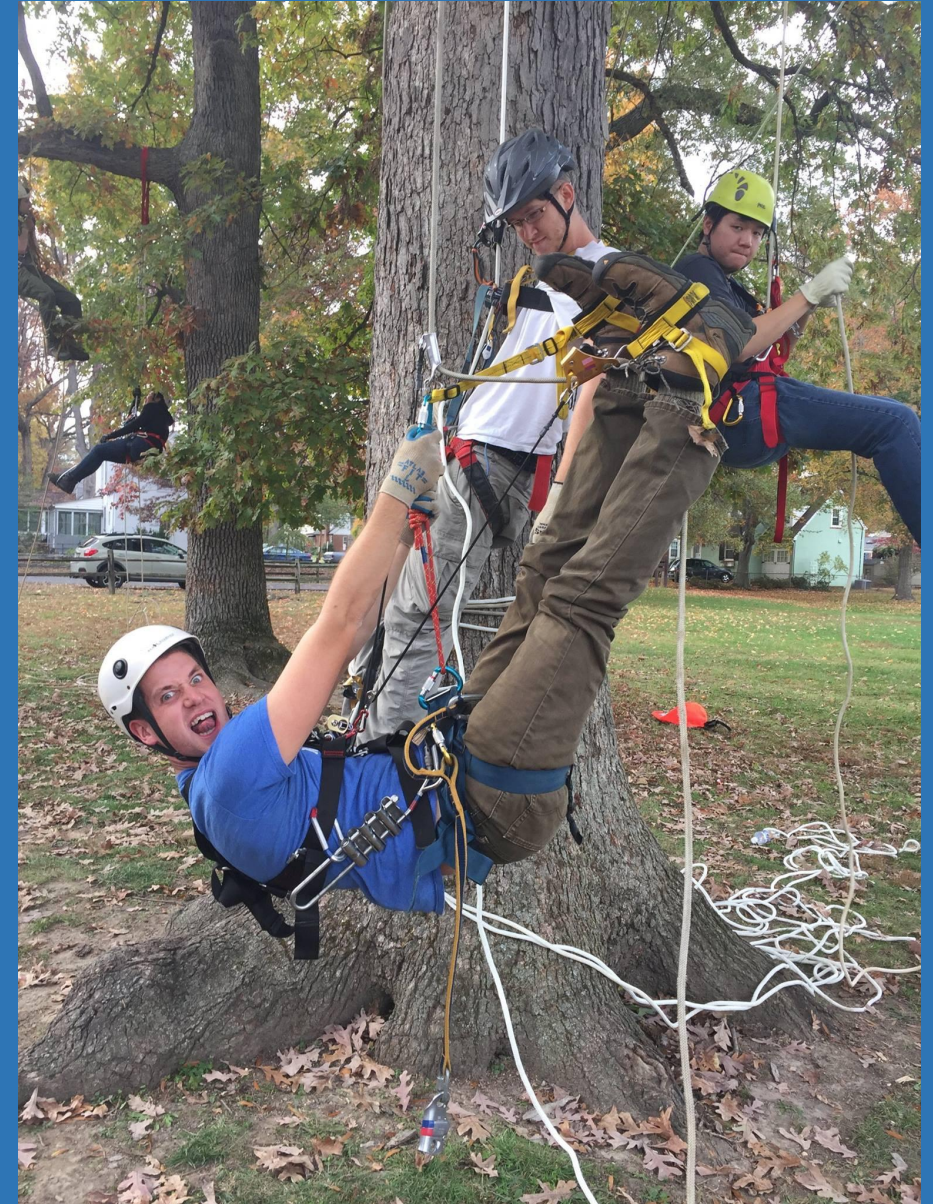
VTC Charter Preamble

- “Our trainers recognize that the best teachers are always learning from their students and will use the best practices in education for effective training.”



VTC Charter Preamble

- “Our goal is to improve vertical safety for cavers, while resisting efforts to develop vertical training certifications as a mechanism to limit or restrict cave access.”



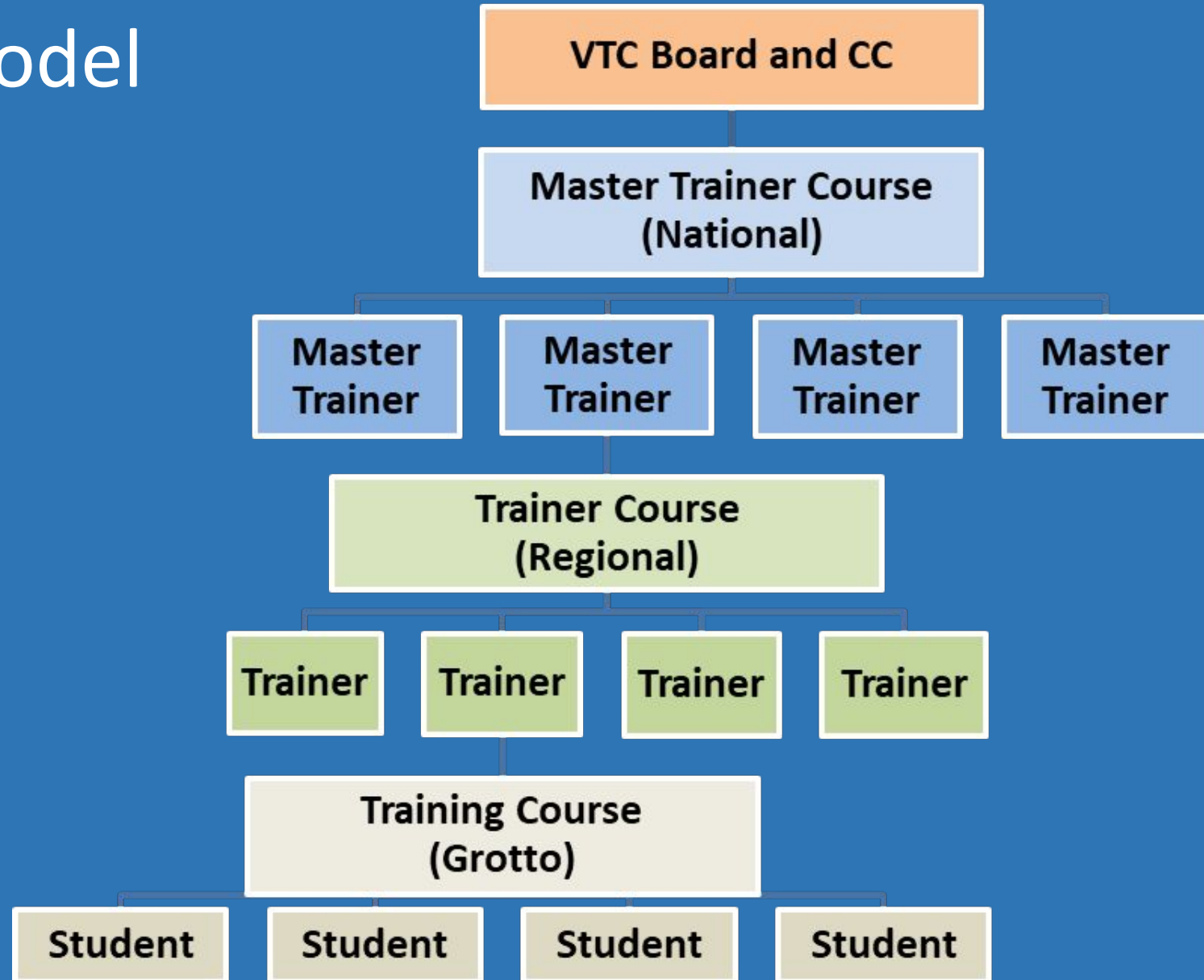
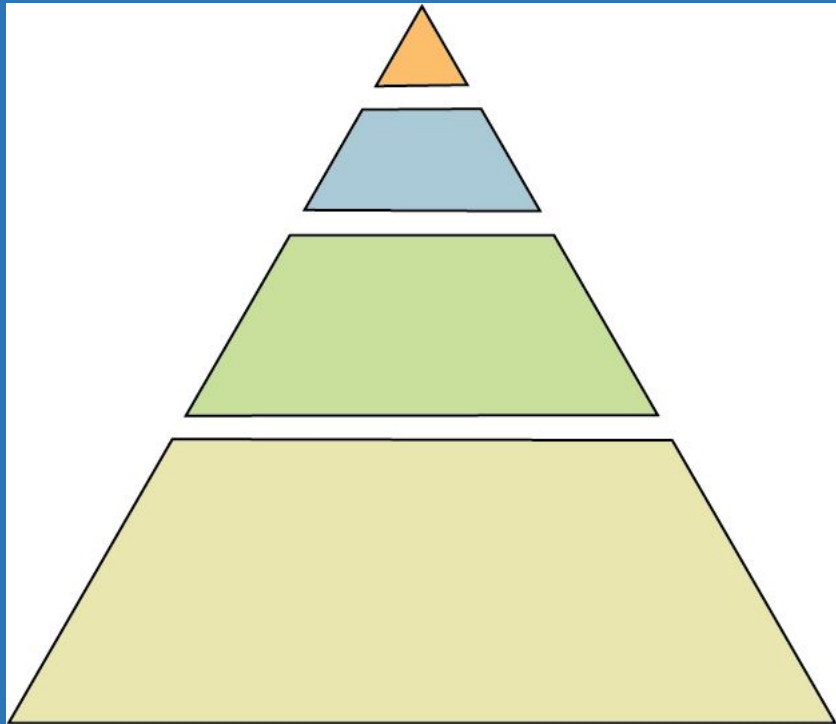
VTC is VOLUNTARY!

- Mission is to support NSS grottos, NOT supplant them.
- Local, grotto-based vertical training minimizes costs.
- VTC trainer and training courses not intended to be mandatory.
- Grottos may continue their own training programs!

Why VTC?

- High quality, up-to-date curricula and training
- Support to trainers
- Vetting of trainers
- Risk management resources
- Access to gear resources

Train the Trainer Model

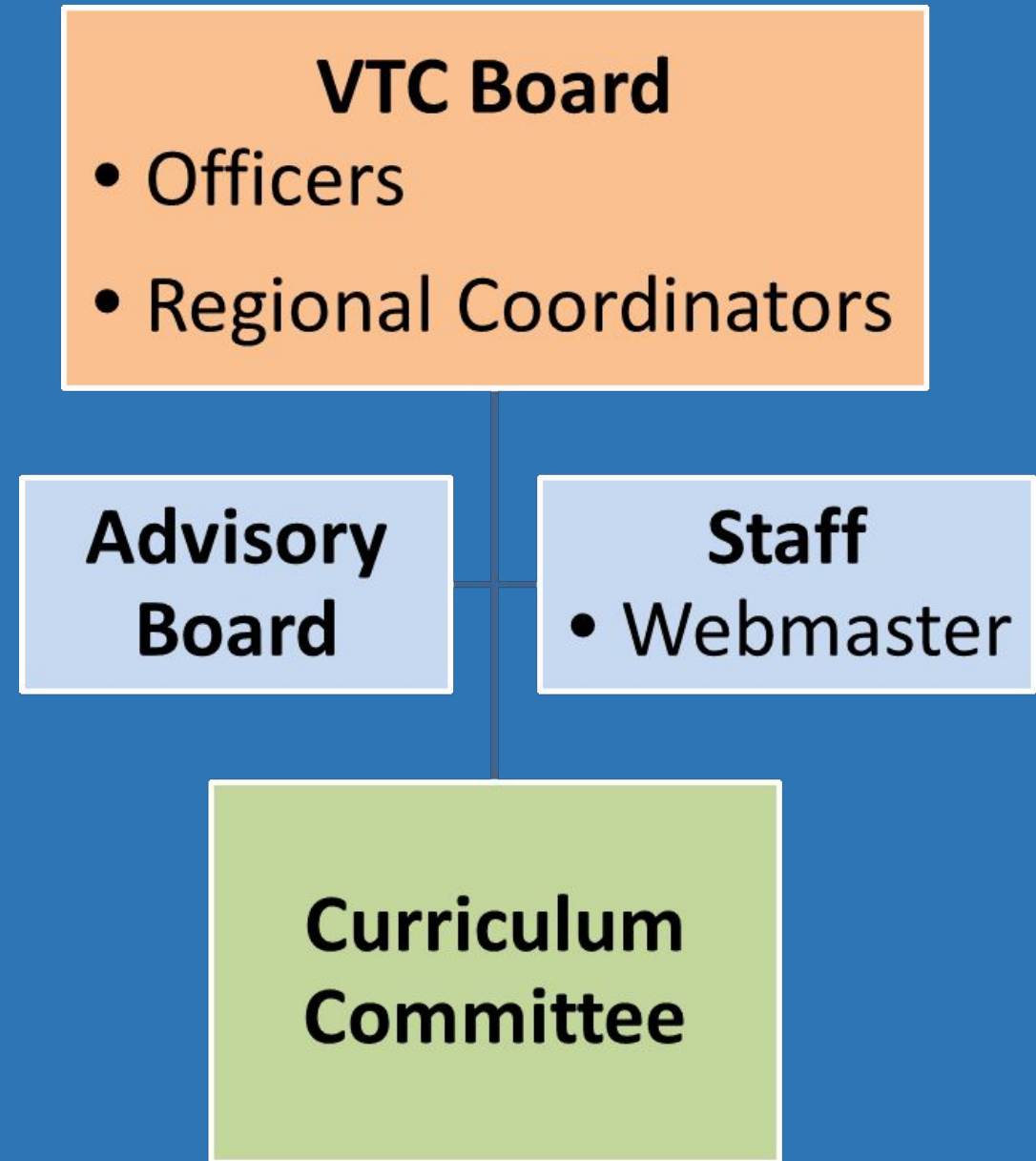


VTC Training Course Progression

- Level 1 – Basic vertical techniques
 - Understand use, care, and inspection of ropes and vertical equipment
 - Rappel and ascend a rigged rope with expected obstacles
 - Deal with unexpected obstacles or problems while on rope
- Level 2 – Rigging and intermediate techniques
 - Understand principles, strengths, and hazards of cave rigging
 - Complete basic rigging
 - Navigate complex technical rigging
- “Level 3” – Advanced courses on special topics
 - Aid or lead climbing in caves
 - Expedition rigging
 - Vertical survey

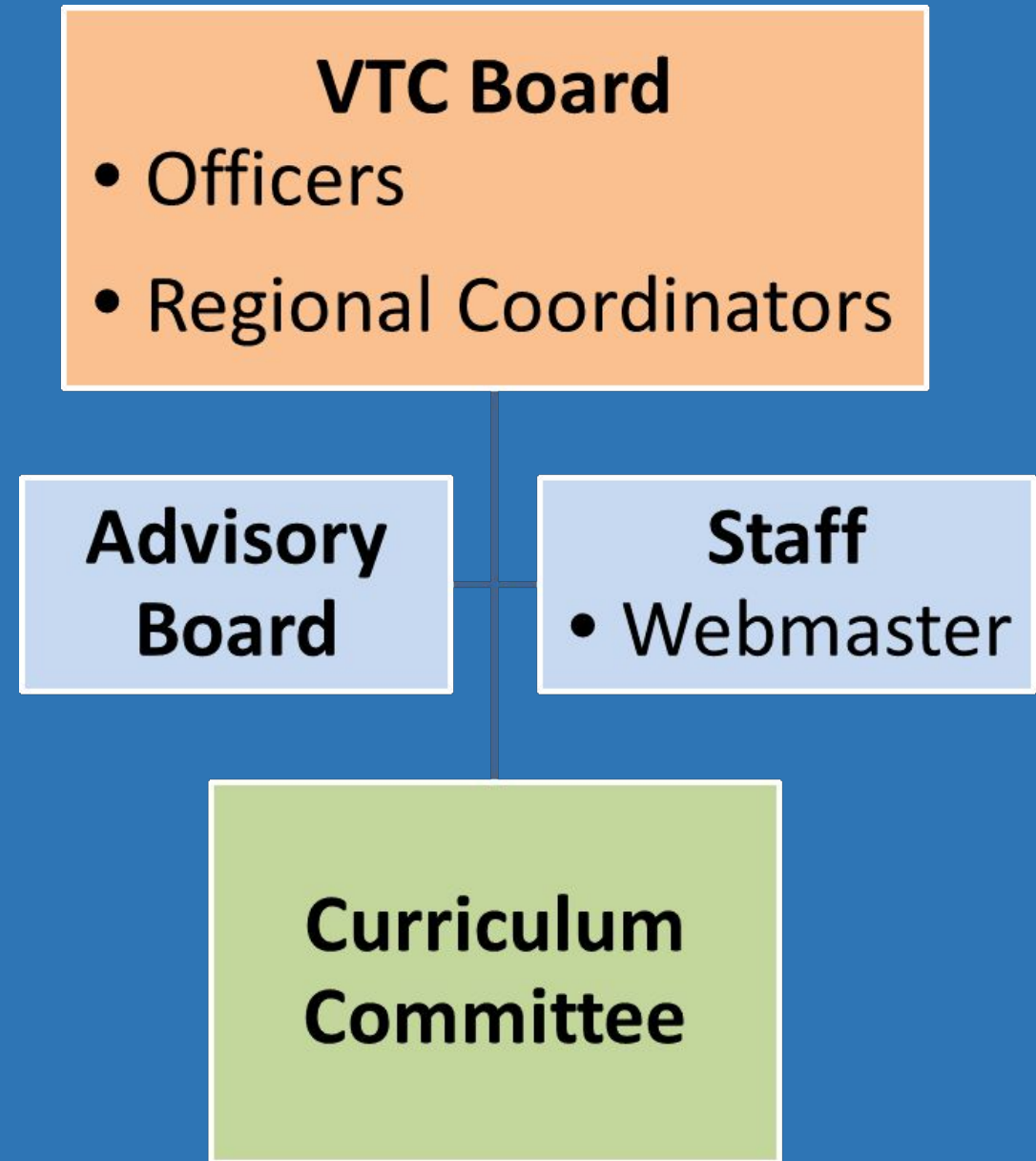
VTC Structure - Board

- 3 national officers and 8 regional coordinators
- Overall oversight of VTC affairs
- Reviews and approves curricula developed by curriculum committee
- Develops/implements qualification criteria for trainers
- Coordinates training events



Curriculum Committee

- 5-7 members, led by Education Coordinator
- Develops curricula for VTC courses, including master-trainer and trainer courses

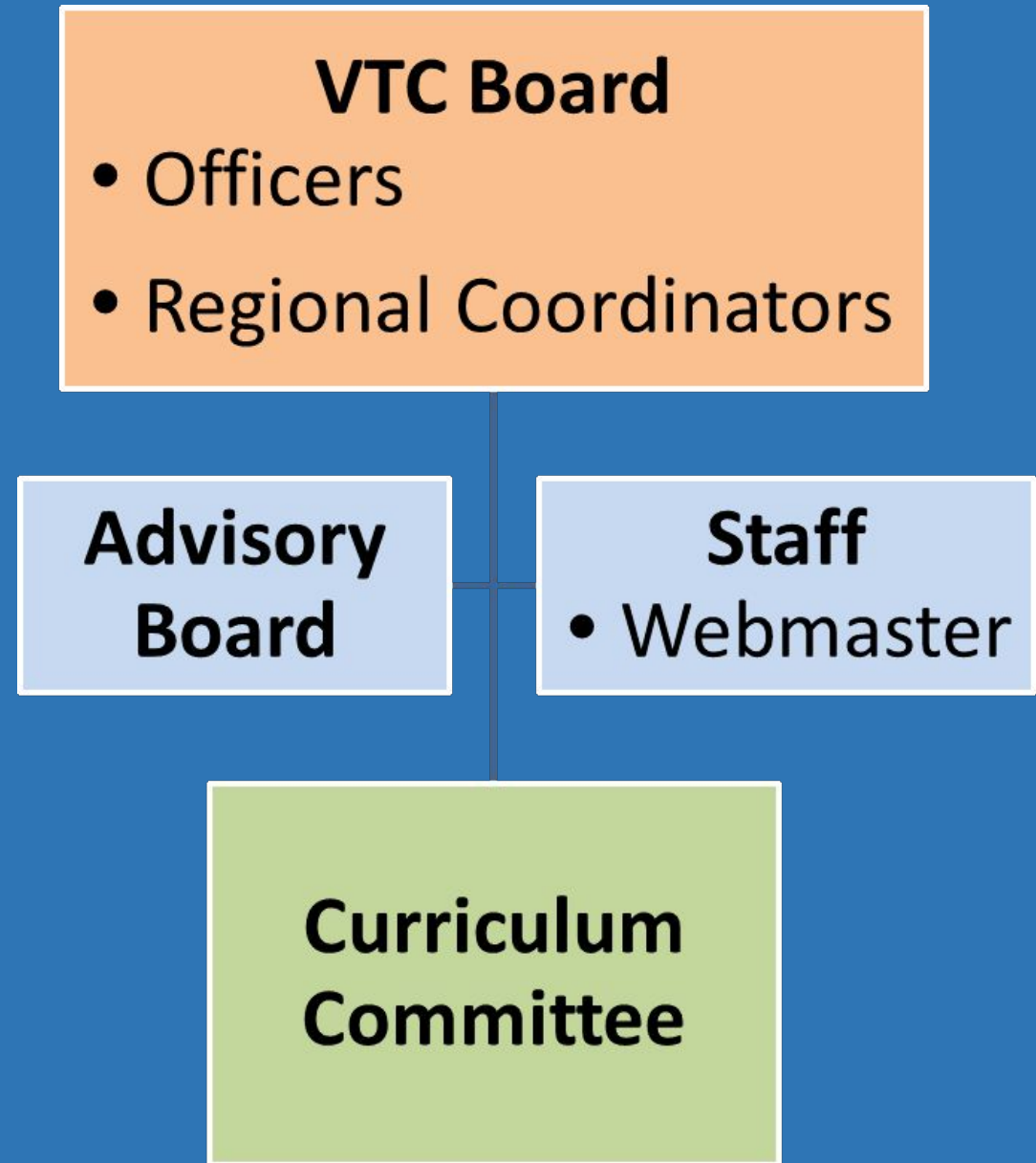


Advisory Board

- Serves as informal advisory resource for the VTC board and curriculum committee

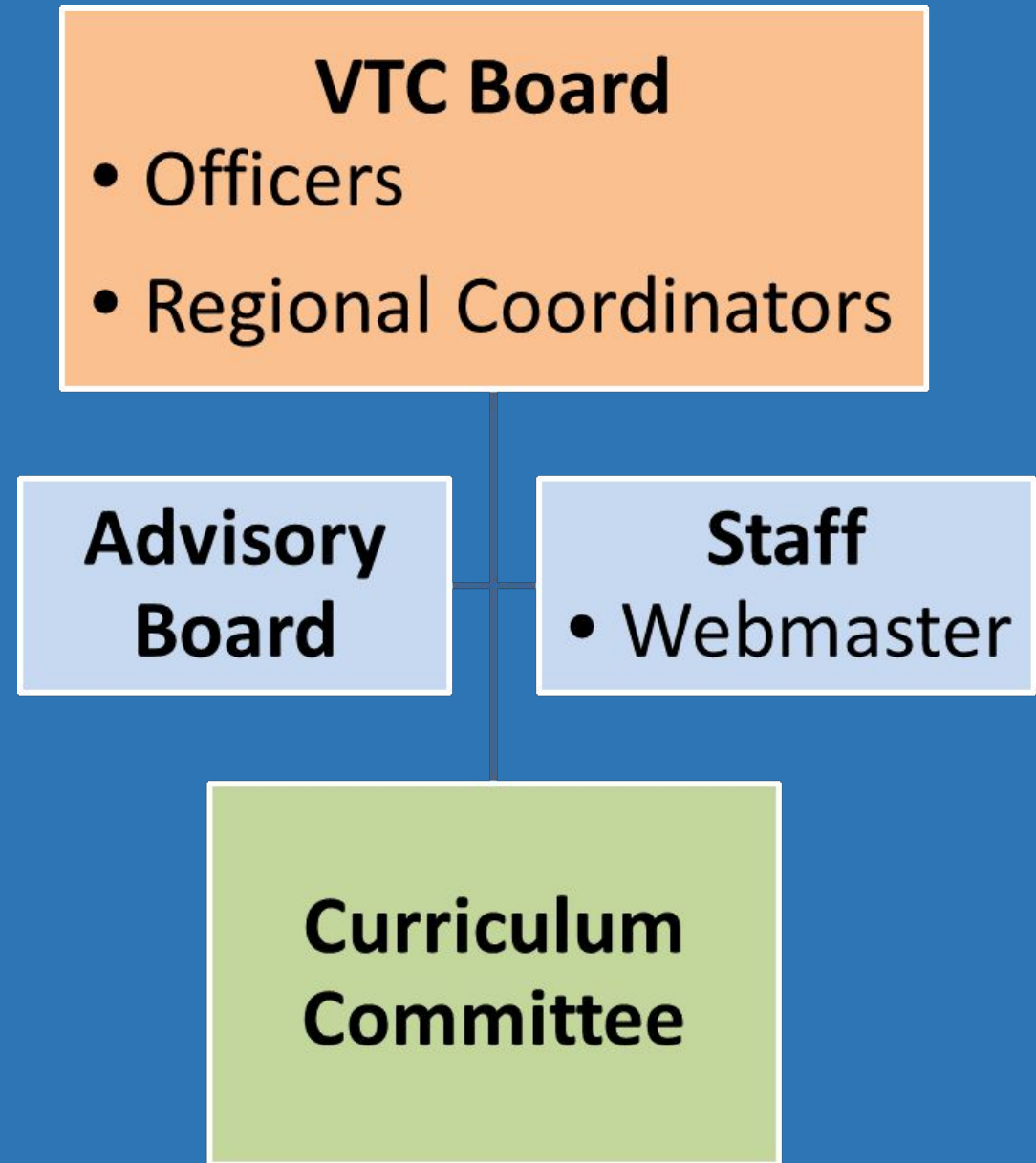
Webmaster

- Builds and maintains the VTC website



Initial Staff Selection

- Online application process yielded 73 applications
- Ad hoc committee led by NSS AVP Adam Weaver made initial selections
- Selection process completed in March 2022



VTC Board – Officers



Ron Miller
National Coordinator



Hazel Barton
Education Coordinator



Jenny Tison
Secretary-Treasurer

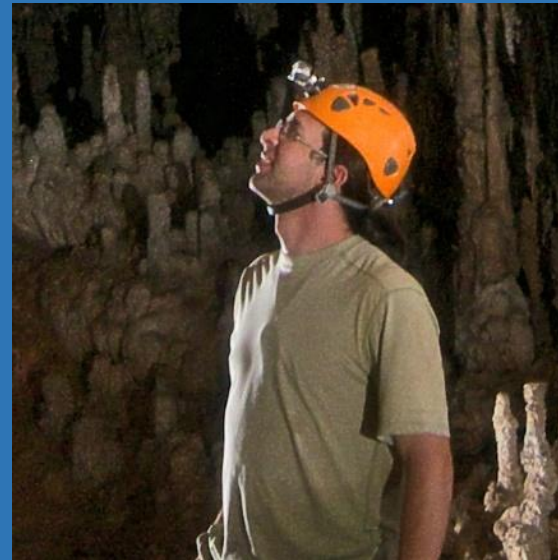
VTC Board – Regional Coordinators



Jessica Van Ord
Northeastern



Kurt Waldron
Eastern



Philip Rykwalter
Southeastern



Anmar Mirza
Central

VTC Board – Regional Coordinators



Geary Schindel
South Central



Georgia Schneider
Rocky Mountain



Annelisa "EC" Moe
Western



Eddy Cartaya
Pacific Northwest

VTC Curriculum Committee



Hazel Barton



Reilly Blackwell



Derek Bristol

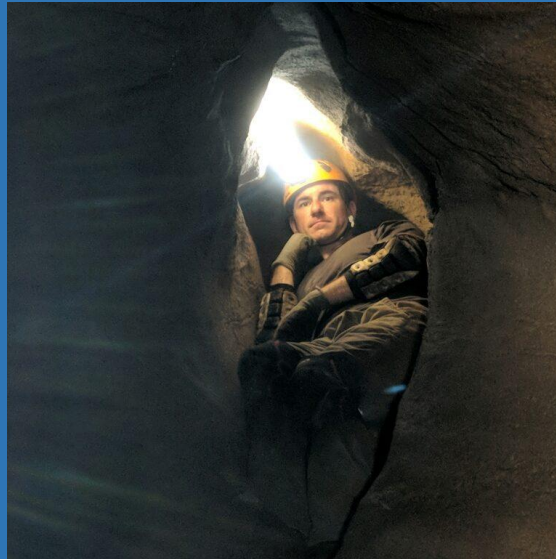


Emily Davis

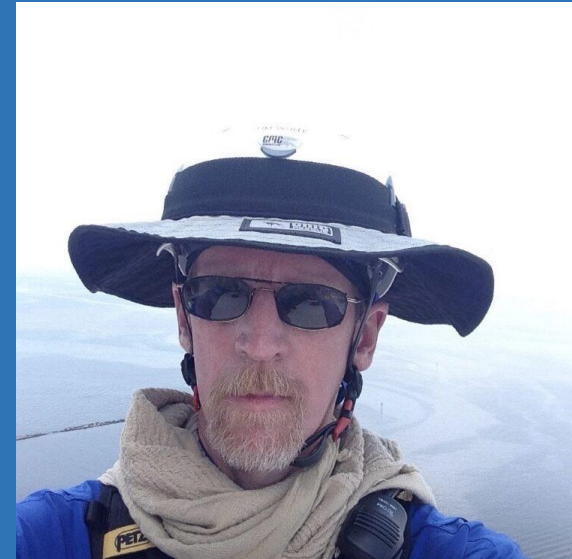
VTC Curriculum Committee



Jesse Houser



Jeremy Weremeichik



Tim White

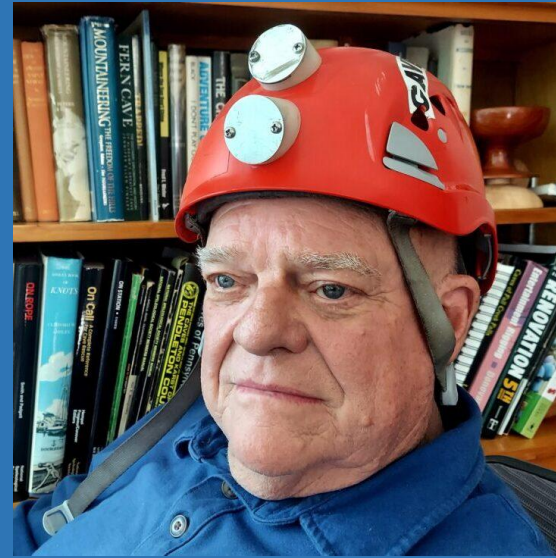
VTC Advisory Board



Pat Kambesis



Gary Holliday



Bruce Smith



Devra Heyer

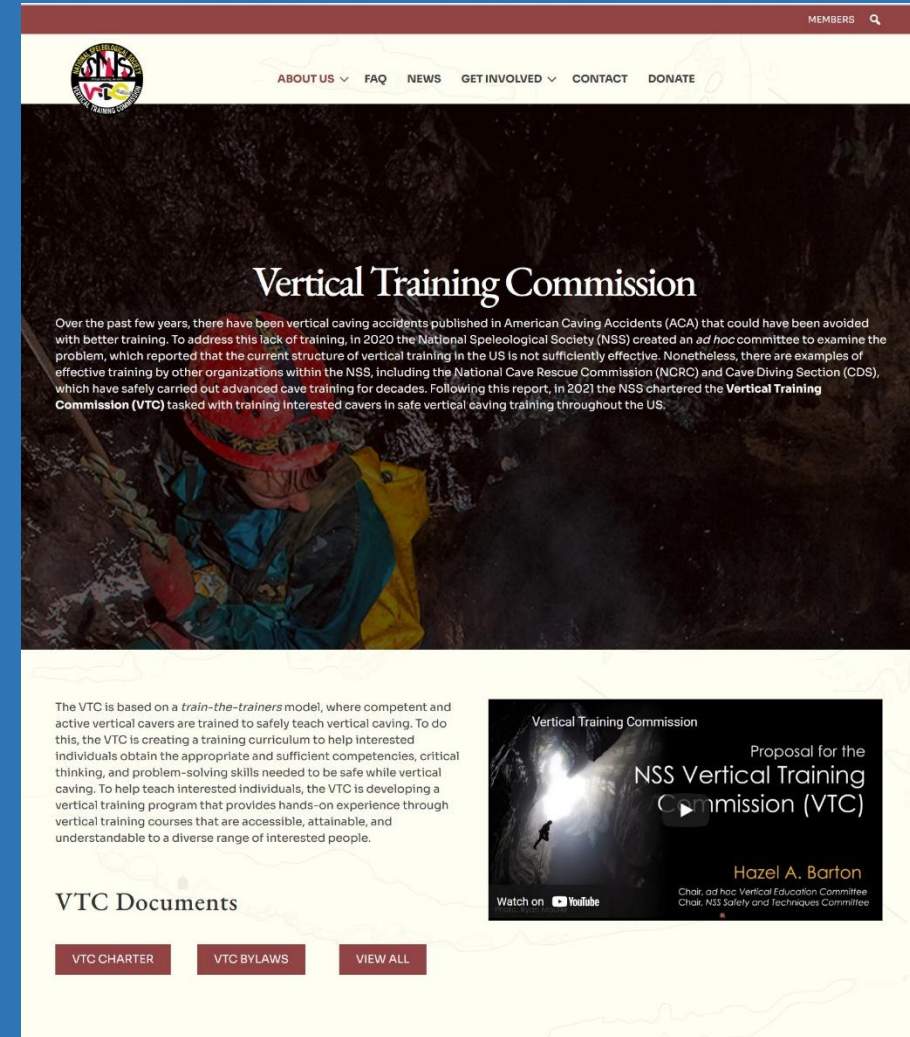
VTC Staff - Webmaster



Aaron Irons
Interim Webmaster

Progress to Date

- Submitted NSS FY2023 budget request in March 2022
- Adopted bylaws in May 2022
- NSS News article in June 2022
- Website live in June 2022
 - vtc.caves.org
 - (site is still in development!)



The screenshot shows the website for the Vertical Training Commission (VTC). At the top, there is a navigation bar with the NSS logo on the left and links for ABOUT US, FAQ, NEWS, GET INVOLVED, CONTACT, and DONATE on the right. Below the navigation bar is a large hero section with a background image of a cave diver. The title "Vertical Training Commission" is centered. Below the title is a paragraph of text explaining the commission's purpose: "Over the past few years, there have been vertical caving accidents published in American Caving Accidents (ACA) that could have been avoided with better training. To address this lack of training, in 2020 the National Speleological Society (NSS) created an ad hoc committee to examine the problem, which reported that the current structure of vertical training in the US is not sufficiently effective. Nonetheless, there are examples of effective training by other organizations within the NSS, including the National Cave Rescue Commission (NCRC) and Cave Diving Section (CDS), which have safely carried out advanced cave training for decades. Following this report, in 2021 the NSS chartered the Vertical Training Commission (VTC) tasked with training interested cavers in safe vertical caving training throughout the US."

Below the hero section is a section titled "VTC Documents" with three buttons: "VTC CHARTER", "VTC BYLAWS", and "VIEW ALL". To the right of this section is a video player with the title "Vertical Training Commission Proposal for the NSS Vertical Training Commission (VTC)" and the name "Hazel A. Barton, Chair, ad hoc Vertical Education Committee, Chair, NSS Safety and Techniques Committee". The video player includes a "Watch on YouTube" button.

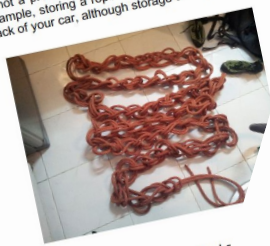
Progress to Date

- Curriculum committee is developing curriculum for Level 1, master trainer, and trainer courses

should never be used to cut objects such as gloves, hair, or clothes, free from a...
It's also why more experienced cavers tend to be overly judgmental when the...
standing on a rope; when coiled at the bottom of a pit, standing on a rope has...
its strength, other than maybe driving some dirt into the core, but stepping o...
the top of a pitch could be catastrophic.

Heat: While descending devices can get hot, the heat transfer is general...
of the rope where it melts and glazes the sheath surface but does not...
strength. Nonetheless, care should be taken to make sure that a rope is n...
heated above its softening temperature (150°C), such as leaving it r...
hot day, and any observable melting should indicate that a rope is n...

Sunlight: The nylon polymer is sensitive to breakdown by UV, b...
is not a problem in caves or during travel, it is worth keeping...
example, storing a rope in your basement or in a closet is n...
back of your car, although storage directly on concrete shou...



Placeholders from internet – need r

Chemicals: Nylon is reasonably...
cause damage in obvious and r...
batteries used in caving lights...
is still such a risk from car be...
fibers even when not in dir...
strong acids, bleach, h...
dramatically reduce stre...

Regular laundry deter...
dirt that gets ground...
accepted method r...
loosely coil in a d...
loading machin...
machine and r...
wet or dry, b...

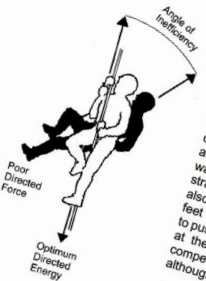
UNEXPECTED VERTICAL OBSTACLES

GENERAL

Bees:

- Texas landscaper killed by swarm of bees while suspended from tree
- A large pit in Mexico which had... ably Africanized bee colonies. We rigged...
climbed and descen... t, disturb them. Even if they were well over 100'
from wh... e hum of the hive.

...device...
...of the night my sole partner got a cramp and...
...not pit. God knows why...
...with two...



Efficiency - Most of the energy used for the climb should come...
from your quadriceps – your arms are not nearly as strong as...
your legs, and you can quickly tire yourself out if you are relying...
on them too much. Nonetheless, all the climbing systems...
require some upper body strength and form becomes really...
important to make sure you don't tire yourself out.

Good form involves thinking about where you should be...
directing force. The goal is to push yourself directly up the rope...
and any force out away from pushing down on the rope is...
wasted effort. For the upright systems, this is relatively...
straightforward, although leaning back can cause your legs to...
also point outward, so keeping your center of gravity over your...
feet is important. With sit-stand systems, there is a tendency...
to push outward with your legs, given that you are sitting down...
at the end of a cycle. To correct this, people sometimes...
compensate by pulling upwards, which can tire the arms...
although a foot ascender can help to keep you vertical.

6-1. Properly directing the climbing...
force can result in minimum wasted...
effort. The angle of inefficiency...
should be as close to zero as...
possible.

In all cases, the more upright you are, the more the quadriceps...
will be doing the work of pushing you up. With climbing...
systems, it is also more efficient to take more, smaller steps...
(similar to the motion of walking up stairs) than deep lunges...
as if you were trying to stand up on a chair, as this involves a...
lot more arm strength to pull. In the case of sit-stand systems...
the key is to find the right height to lift the legs that you can...
repeat over and over again – deep squats require a lot more...
effort that standing up from a chair. In all cases, a cadence that...
allows you to climb consistently without getting out of breath is ideal, but without such small steps...
important that your equipment is fitted correctly to your body.

Fitting - To get the most out of your climbing system and reduce wasted effort, your ascending...
system needs to be tuned to your body shape (the length of your arms and legs). The first time a...
lot of people try vertical, they borrow equipment and get really frustrated that they can't climb –...
this usually has nothing to do with you, or your technique. You are using equipment when the...
foot loops and ascenders are tuned for someone taller (your steps are too short) or shorter (your...
steps are deep and exhausting). Ill-fitting equipment is perhaps the biggest reason that people...
become exhausted and get into trouble when climbing. We provide some simple instructions on...
how to do this, but the best way is to have someone experienced in the climbing system you...
choose to help you adjust it and show you how the different lengths can effect the amount of...
energy you need to expend to climb.

RECOGNIZE THE APPROPRIATE EQUIPMENT FOR USE IN VERTICAL CAVING

There is a lot of equipment that is sold for climbing and organizations that certify equipment...
testing it to make sure it is safe enough to endure the shock-loading and wear the could expected...
to be encountered during use (as vertical caving is considered a form of climbing, the equipment...
is certified by these same organizations). These organizations are the Union Internationale des...
Associations d'Alpinisme (UIAA), Comité Européen (CE) and European Standards or

Progress to Date

- Board task forces working on key priorities
 - Trainer qualifications procedures
 - Operational procedures
 - Risk management strategies

MEMBERS

ABOUT US ▾ FAQ NEWS GET INVOLVED ▾ CONTACT DONATE

Vertical Training Commission

Over the past few years, there have been vertical caving accidents published in American Caving Accidents (ACA) that could have been avoided with better training. To address this lack of training, in 2020 the National Speleological Society (NSS) created an *ad hoc* committee to examine the problem, which reported that the current structure of vertical training in the US is not sufficiently effective. Nonetheless, there are examples of effective training by other organizations within the NSS, including the National Cave Rescue Commission (NCRC) and Cave Diving Section (CDS), which have safely carried out advanced cave training for decades. Following this report, in 2021 the NSS chartered the **Vertical Training Commission (VTC)** tasked with training interested cavers in safe vertical caving training throughout the US.

The VTC is based on a *train-the-trainers* model, where competent and active vertical cavers are trained to safely teach vertical caving. To do this, the VTC is creating a training curriculum to help interested individuals obtain the appropriate and sufficient competencies, critical thinking, and problem-solving skills needed to be safe while vertical caving. To help teach interested individuals, the VTC is developing a vertical training program that provides hands-on experience through vertical training courses that are accessible, attainable, and understandable to a diverse range of interested people.

VTC Documents

VTC CHARTER VTC BYLAWS VIEW ALL

Vertical Training Commission

Proposal for the
NSS Vertical Training
Commission (VTC)

Hazel A. Barton
Chair, *ad hoc* Vertical Education Committee
Chair, NSS Safety and Techniques Committee

Watch on YouTube

Next Steps – Training Courses

- Finalize / adopt trainer qualification procedures – July 2022
- Select initial trainer / master trainer candidates – August 2022
- Complete and pilot Level 1 curriculum – Fall 2022
- Complete and pilot trainer / master trainer curricula – Fall 2022
- Offer initial Level 1 training courses – early 2023



Next Steps – Organizational Development

- Complete operational procedures
- Develop an outreach program
- Evaluate approaches necessary to maximize opportunities for caver training
- Develop a data management system
- Undertake a strategic planning process

Next Steps – Risk Management

- Context: We know that personal and organizational liability exposure concerns have created reluctance among vertically competent cavers to do vertical training
- Our goals:
 - Help VTC achieve its mission of maximizing accessibility of high quality vertical training
 - Embed a holistic risk management approach into VTC's culture (and into what we and our students take out into the world)
- Next steps: Develop risk management strategies to:
 - Maximize safety (e.g. policies, procedures)
 - Minimize liability exposure (e.g. insurance, waivers)

Next Steps – Financial

- Funding needs:
 - Initial costs (curriculum build-out, site fees, course gear cache, insurance)
 - Scholarship program – help ensure that financial limitations don't preclude caver access to high-quality vertical training
- Funding sources:
 - **NSS:** partial initial operating support - \$6,000 through Mar 2023
 - **Fundraising:** keeps course fees low and build scholarship fund
 - **Students:** fee for training

Get Involved!

- Donate cash - \$15,000 Convention fundraising goal
 - \$5,000 for initial course gear cache
 - \$10,000 “seed funding” for VTC scholarship fund
 - Limited edition VTC hats for \$1K donation!
 - Donate online at vtc.caves.org (checks OK too!)
- In-kind donations or discounts (new only, please!)
 - Rope and webbing
 - Rigging hardware



Get Involved!

- Volunteer
 - Trainer and master trainer applicants still needed
 - Many other types of volunteer support will be needed
 - Applications available on VTC website
 - Talk to your regional coordinator



Acknowledgments

- Vertical section
- Ad hoc vertical training committee
- Vertical training transition committee
- NSS board of governors
- Participants in VTC charter development process
- Applicants for VTC initial positions
- Current VTC board, curriculum committee, and staff
- Shout outs: Hazel Barton, Adam Weaver, and Geary Schindel

Thank you!



Contacts:

- Ron Miller – national@vtc.caves.org
- Jenny Tison – s-t@vtc.caves.org
- Hazel Barton – education@vtc.caves.org